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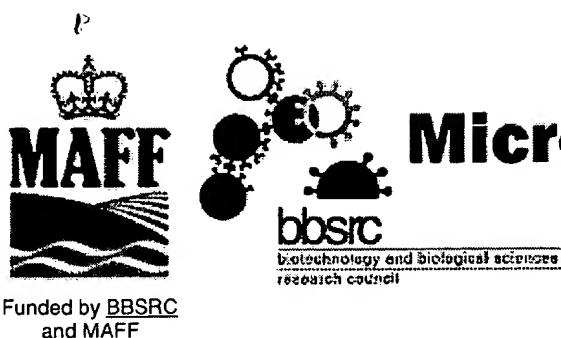
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Microbial Ecology

Ectomycorrhizal helper bacteria

Bacteria isolated from ectomycorrhizal roots are being screened for ability to enhance ectomycorrhizal synthesis.

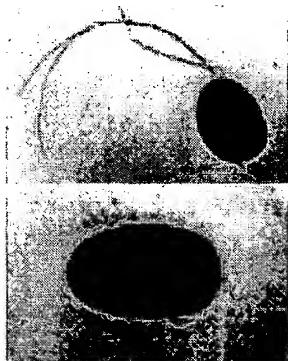
Contact: John.Whipps@hri.ac.uk or Gary.Bending@hri.ac.uk.

Pseudomonas plant-microbe interactions

1. Colonisation

Motile and non-motile mutants of *Pseudomonas* spp. are being used to identify the significance of flagella in survival, spread and attachment of bacteria to surfaces in soil and on roots.

Contact: Alun.Morgan@hri.ac.uk or John.Whipps@hri.ac.uk.

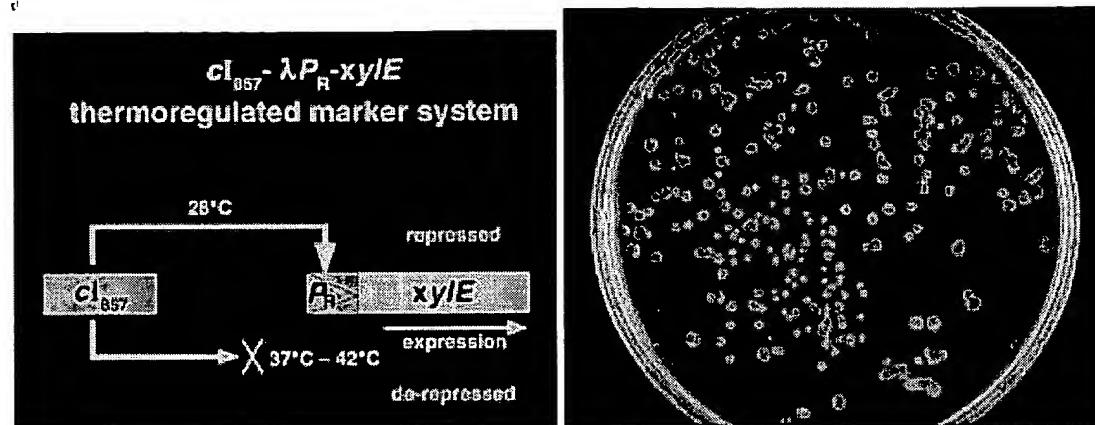


Motile *Pseudomonas putida* (top) and non-motile mutant (bottom)

2. Antibiotic production

The role of homoserine-lactone signalling (HSL) in the regulation of antibiotic production in *Pseudomonas* spp. on roots is under investigation. The development of bioassays for HSL, phenazine and the use of marker genes are key elements of this project.

Contact: Alun.Morgan@hri.ac.uk.



Left: broad host range marker gene *xyIE*

Right: yellow colonies-*xyIE*⁺, white colonies-*xyIE*⁻

3. Release of GMMs

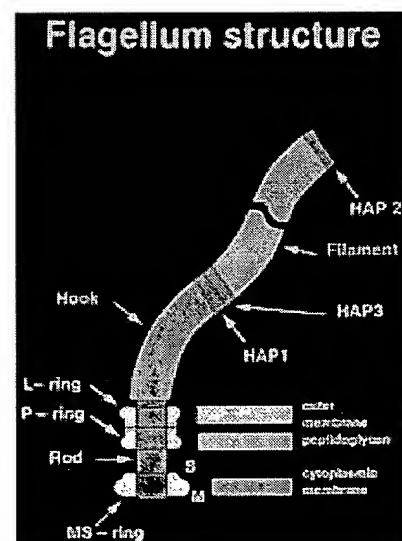
The first UK field trial of a marked, free living bacterium was performed at HRI in the Spring of 1993. *Pseudomonas fluorescens* SBW25 was genetically tagged with the reporter genes *lacZY* and *xyIE* in addition to resistance to the antibiotic kanamycin. Following release on to wheat, the survival, spread and impact of this bacterium was monitored for 4 years.

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4. Characterisation of strains

The bacterial flagellin protein has been widely used to serotype bacteria, and in this project, PCR amplification of the flagellin gene of *Pseudomonas* spp. is being used as a tool to differentiate strains within a species. Comparisons of this method to genomic RFLP studies, phage typing and serological tests indicate that it has great potential. This work has recently been expanded to include *Burkholderia* strains (formerly *Pseudomonas*).

Contact: Alun.Morgan@hri.ac.uk.



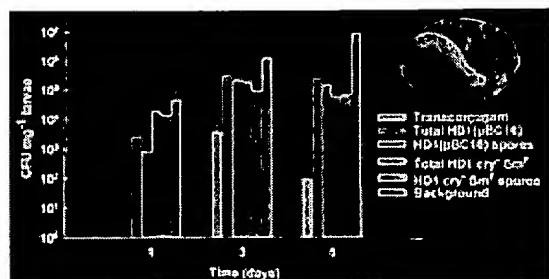
PCR amplification of flagellin gene

The molecular interactions of insect pathogens and their hosts

1. Plasmid transfer in the insect pathogen *Bacillus thuringiensis* (Bt) in the environment

Genetic exchange of a range of plasmids *in vitro*, in soil and in insects is being examined for the insect pathogen Bt. This information will be used for risk assessment, strain construction and also to understand the role gene exchange has played in the development of strains harbouring multiple toxin genes.

Contact: Alun.Morgan@hri.ac.uk or John.Whipps@hri.ac.uk.



Gene transfer between Bt strains in lepidopteran insects

2. Characterisation of new toxins active against insects

The molecular structure of new bacterial toxins are under investigation with the aim to understand their mode of action and the possibility for genetic improvement. This work is undertaken in collaboration with Paul Jarrett in Entomological Sciences.

Contact: Alun.Morgan@hri.ac.uk.

Pesticide degradation

Microorganisms have been shown to possess the ability to degrade a range of pesticides and remove them from soil. In this research area, the ecology of pesticide degrading bacteria is under study to determine how these populations develop in the field, how persistent they are as well as the molecular characterisation of the breakdown pathway. In addition the potential use of these isolates to bioremediate soil and water is being assessed.

Contact: Alun.Morgan@hri.ac.uk or Steve.Roberts@hri.ac.uk.

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No. 20* November 21, 2001

Last Issue for 2001

This is the twentieth and last issue of the *Home, Yard & Garden Pest Newsletter* for 2001. Comments about the newsletter are always appreciated. Feel free to let me or any of the authors know what you like or dislike about it as you see us at winter programs and other events. You can also contact any of us by phone, letter, or e-mail me at nixonp@mail.aces.uiuc.edu.

We are in somewhat of a transition stage between this newsletter's being offered only by mail to its being offered only on the Internet. Our mail subscriptions have dropped by two-thirds over the past few years as more people access this newsletter electronically. We do not know how many more years will pass before we make the transition completely to Internet access, but it is likely to occur.

If you are a mail subscriber, you will be contacted during the winter about renewing your subscription. We are expecting a modest \$3.00 price increase in subscription rates to cover cost increases. Regardless of whether you receive this newsletter by mail or Internet, 2002 issues are expected to start in the first half of April. Thank you for your support and interest.

(*Phil Nixon*)

INSECTS

Milky spore disease is a bacterium initially referred to as *Bacillus popilliae* known as *Paenibacillus popilliae* applied to turfgrass as a dust. It is effective in controlling Japanese beetle grubs; it has activity on other grub species. However, stages are susceptible to the bacteria. Grubs must ingest the bacteria because the mode of entry is through the mouth. The spores reproduce within the grub, even in the hemolymph, the internal insect fluid, which is white. Infested grubs eventually die, and the spores disperse into the surrounding soil. The bacteria does not always produce spores; spores may pass through the gut and be excreted in fecal matter.

Milky spore disease was produced by collecting thousands of Japanese beetles in the wild each spring and fall and bringing them to a laboratory for processing. Milky spores do not germinate well on an artificial medium, such as tubes. Nor will the bacteria develop on their own; infection needs to be induced through means. This is normally accomplished by injecting live grubs with bacterial spores.

In the 1980s, it turned out that a different related bacteria was actually being produced; it had little activity on Japanese beetle grubs. As a result, products were withdrawn from the market. An earlier, more efficient, and less

Milky Spore Disease

The primary method of managing Japanese beetle grubs in turfgrass is with the use of insecticides such as trichlorfon (Dylox), halofenozide (Mach 2), and imidacloprid (Merit). All these materials are highly effective in maintaining Japanese beetle grub numbers below damaging levels. However, there is growing interest in the use of alternative pest control materials such as beneficial nematodes and microbial-based insecticides. One of the first microbial insecticides ever registered in the United States was milky spore disease. This bacterium was first detected in New Jersey in 1933. It became available commercially for use on turfgrass in 1948.

formulation method is now being used for milky spore disease.

Successful use of milky spore disease depends on attention to environmental conditions. temperature, moisture, soil structure, and type. Efficacy of the disease may vary with cold temperatures; the spores are very ideal soil temperatures for spore development. Ideal soil temperatures for grub attack are between 60 °F and 21 °C. In cooler climates, like the Northeast, spore may take longer to spread than in warmer climates. It is important to know the soil within the profile during the fall and early spring when grubs are active.

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Milky spore does not spread unless grubs are present in the soil. The density of the grub population is important in the establishment and buildup of the bacteria in the soil. As a result, the higher the density of the grub population, the faster milky spore will become established. In addition, infected grubs may eventually spread through the soil profile, increasing the likelihood of spreading the bacteria.

Bacterial spores tend to be concentrated in areas with high grub numbers. Spores bind tightly to soil particles and are normally located near the soil surface where grubs are likely to be located. Persistence in the soil ranges from 2 to 10 years with persistence as long as 30 years if grub recycling continues. In fact, studies have demonstrated that milky spore can last 15 to 20 years in the soil. It has been thought that milky spore may remain in the soil in a dormant but viable state until new infestations of grubs are present.

Milky spore disease is a population suppressant. The goal when using milky spore disease is to keep Japanese beetle levels below damaging thresholds (10 to 12 grubs per square foot). However, the use of milky spore disease is not without problems or

PLANT DISEASE

Daylily Rust: What's the Big Deal?

You may have read something recently about a new rust disease on daylily that is spreading rapidly across the United States. The rust is daylily rust, discussed in issue number 15 of this newsletter. We've talked about rusts before on many landscape plants that were never considered major problems, so what's the big deal?

Daylilies have not been plagued with any disease or insect problems in the past. They have been grown and have been bred to provide hundreds of selections that thrive in our gardens. Many gardeners have become daylily collectors and have invested considerable time, plants, and space to develop splendid displays of these plants. Along comes a new disease that causes yellow to brown spots on the leaves, poor plant vitality, and leaf death in susceptible varieties. In addition, this rust can infect in 2 days, and spores are spread easily by wind and water. The pathogen can move easily between nurseries because spores can be present on leaves and

concerns. First, it can be very difficult to determine results because other microorganisms (for example, predators and pathogens) in the soil may kill Japanese beetle grubs more rapidly than milky spore. Second, milky spore affects only one species of white grubs; and, in some situations, the Japanese beetle may not be the only or the predominant species. Third, results may take several seasons, 3 to 5 years in cooler climates, so several years may lapse before adequate control of grubs is achieved. Furthermore, populations of the pathogen may not increase quickly enough to retard the spread of an isolated colony of grubs. Finally, the use of milky spore may be cost prohibitive compared with other currently available pest control materials.

Birds and other wildlife that inadvertently move infected grubs when feeding naturally disperse the spores of milky spore disease. Milky spore is usually compatible with conventional insecticides. Research has determined that milky spore has no impact on beneficial organisms in the soil. In addition, it appears that the bacterium is compatible with *Tiphiidae* wasps, which are parasitoids of Japanese beetle grubs. (Raymond Cloyd)

symptom-free plants. The good news is that species in the garden are not hosts of this rust found on daylily and a perennial called so far there have been no reports of rust on the United States.

Since my first article on this disease, the Clinic has confirmed three cases of daylily rust in Illinois. It appears that all three cases involved plants that had been ordered by mail from out of state. Illinois Department of Agriculture inspector has seen daylily rust in Illinois nurseries. The general prediction is that this rust will soon become more common in our gardens, but meanwhile we should do our best to keep it contained. Inspect new plants carefully. Because plants could be infected but show symptoms, consider isolating new plants until you are certain that rust is not present. If rust is found in your daylilies, remove and destroy infected plants. Consider using a fungicide to control this rust.

There is currently no fungicide that specifically lists daylily and rust on its label. It is likely that chemical testing will provide more information on efficacy in the next year. Meanwhile, the Illinois Department of Agriculture and Consumer Services makes the following recommendation to Florida commercial nurseries and shippers of daylilies: spray to protect new growth by applying alternately one of the following four fungicides at the label rate:

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interval: propaconizole (Banner Maxx), azoxystrobin (Heritage), flutolanil (Contrast), myclobutanil (Systhane).

I have two concerns with this chemical information. One is the availability of the products to homeowners. The names in parentheses are commercial trade names of products containing the active ingredient listed. These products may be used by homeowners, but commercial products usually come in

Beetle, elm leaf 3:2; Japanese 9:1, 10:1, 11:1; Black turfgrass ataenius 4:3; Borers, bronze birch 3:2; flatheaded apple tree 4:2; roundheaded appletree 4:2; lilac (ash) 3:2, 8:2; Cankerworm, 2:3; Caterpillars, Eastern tent 2:3; European pine processionary 2:3; white marked tussock moth 13:2; unusual Cicada killers 15:1; Dormant oil 1:2; 19:1; Flies, robber 16:3

large packages at considerable cost. Propaconizole is available in a homeowner product called Fertilome Systemic. Myclobutanil is available in a homeowner product called Immunox. The other two chemicals are not available in homeowner-sized packages.

My second concern is the suggestion of alternating two products. Many of the new systemic products (all of those suggested) are more effective than protective contact fungicides because they are systemic and because they have very specific ways in which they stop the fungus. When they are used repeatedly, the fungal pathogen (rust) may develop resistance to the fungicide, making it ineffective. The recommendation of alternating two products is intended to try to prevent fungicide resistance from developing. Modes or sites of action of chemicals are given names. Propaconizole and myclobutanil are DMIs, azoxystrobin is a STAR, and flutolanil is an Oxathiin (not understood). These labels categorize the fungicide according to how it works on the fungus. Because propaconizole and myclobutanil are both DMIs, rotating them will be ineffective. Nothing is gained when a homeowner alternates between Fertilome Systemic and Immunox. As more information develops on management of daylily rust, we will pass it along to our readers. Meanwhile, keep an eye on the daylily rust Web pages referred to in issue 15 of this newsletter. (Nancy Pataky)

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GROWING MARKETS

NEW TRENDS IN SUSTAINABLE FARMING BUILD COMPOST USE

As large-scale growers seek better ways to control pathogens, meet consumer demand for "cleaner" food and improve profit margins, the market for composted products expands even faster.

Christy Porter Humpert

ON A RECENT morning in California's Salinas Valley, over 150 growers packed the auditorium at the local farm advisor's office for a workshop on sustainable wine grape growing. Growers who previously embraced conventional farming practices are turning to sustainable agriculture, providing an expanding market for compost and mulch.

Sustainable agriculture involves practices that preserve natural resources and biodiversity, while still being economically viable. These practices may include the use of beneficial insects, the planting of cover crops, and/or the application of compost or mulch. Farmers who commit to sustainable practices don't necessarily give up all pesticides and herbicides. However, prior to spraying a pesticide, they are more likely to try ecologically sound alternatives, such as beneficial insects and pest monitoring.

This article first explores the reasons for the increase in sustainable farming. We'll then consider the best approach for promoting compost and mulch use to this expanding market.

WHY THE SUDDEN INCREASE IN SUSTAINABLE FARMING?

Many growers, large and small, who have traditionally grown their crops with regular applications of chemicals are now turning to sustainable practices for a number of reasons. These include pesticide restrictions, consumer demand for "cleaner" food, increased awareness of the soil foodweb, environmental pressures from the public, saving money and building profits.

Impending restrictions on pesticides — Growers who have traditionally relied on pesticides and herbicides are seeing increased restrictions on chemical use. In the case of methyl bromide, a widely used soil fumigant that has been shown to deplete stratospheric ozone, U.S. EPA regulations are reducing use each year with the ultimate goal of eliminating use by 2005. Growers who rely on methyl bromide, especially strawberry growers, are actively searching for alternatives with fewer environmental impacts.

In addition to the restrictions on methyl bromide, the U.S. EPA is also reassessing the safety of many other commonly used agricultural chemicals, including a review of the allowable limits (tolerances) for pesticide residues in food. By August 2006, the EPA will complete its review of all tolerances that were in effect in August 1996 when the Food Quality Protection Act was passed. Many growers are concerned about restricted use of pesticides, especially organophosphates that are in the first priority group of pesticides to be reviewed. Growers are starting to plan and experiment now for the loss of chemical tools in the next

few years. And because compost and mulch have been shown to reduce the incidence of many plant pathogens, including Phytophthora, growers are looking to these soil amendments as a possible alternative to pesticides.

Consumer demand for "cleaner" food — Demand for organic food has grown an average of 24 percent per year since 1990 and is predicted to continue to increase at a rate of over 20 percent per year. And it's no longer just natural foods stores that sell organic produce; 30 percent of organic food sales are to mainstream grocery stores. In addition, some major grocery retailers have nonorganic produce tested to ensure there are no detectable pesticide residues. Because sustainably minded growers tend to use fewer pesticides, they are responding to consumer demand for cleaner food.

Increased awareness of the soil food web — Many university cooperative extension advisors are now educating growers about the importance of organic matter in healthy soil. Exclusive additions of chemical fertilizers are no longer considered the best method to feed the plant and keep plant pathogens under control. Growers are understanding that they must add some type of organic material to soil, whether it be cover crops, compost, or another type of organic amendment. This organic matter increases microbial biomass and helps maintain these beneficial bacterial and fungi populations.

Environmental pressures from the public — Agriculture is under attack by environmental groups who see farmers as the cause of polluted water ways, clear-cut oak forests, and pesticide plumes near schools and other urban areas. As urban areas encroach on traditional agricultural lands, the urban population is making increasing demands on growers. In response, many growers are forming voluntary sustainable farming groups that teach their members how to farm in an environmentally responsible manner. These groups, such as California's Central Coast Vineyard Team, conduct field days and workshops for growers, in addition to acting as a liaison to environmental groups and the media.

Makes good business sense — In many cases, growers are finding that sustainable practices can actually save them money. For example, sustainable growers are taught to monitor crops for pests through traps. Farm advisors set tolerance levels for pests; at or below the tolerance level, the crop loss is estimated to cost the same or less than applying pesticide. Through monitoring, growers sometimes save money on pesticides.

WHY ARE SUSTAINABLE GROWERS USING COMPOST?

Attend a sustainable agriculture workshop and a variety of topics will be on the agenda. While pest management is one of the most popular issues, interest continues to grow in the area of soil quality. Compost is one tool for improving soil quality and growers cite a number of reasons for its use: Increases soil organic matter (feeds soil microorganisms, and increases water and nutrient holding capacity); Suppresses plant pathogens; Reduces erosion; Provides an alternative to the use of raw manures that may introduce pathogens; and Provides a slow-release source of nutrients

Sustainable growers have a number of "tools" for improving their soils. Cover crops are extremely popular, and many growers see compost and cover crops as an either/or choice. There are some definite advantages to cover crops. They provide between one to five tons/acre of dry organic matter with negligible transportation costs. In addition, the seeds typically cost less per acre than compost. However, there are also disadvantages to planting cover crops. They can complicate planting schedules and cause land to come out of production. In addition, some cover crops may require extra water.

Dr. Louise Jackson, a researcher at the University of California at Davis, has been studying the synergistic effects of compost combined with cover crops for the past few years. Preliminary results have shown that

pairing compost with cover crops significantly increased soil microbial biomass and vegetable crop yield over almost a year. Jackson notes that soil microorganisms increase immediately after a cover crop is incorporated into the soil. This increase in microbial biomass typically disappears in four to six weeks. However, when compost was added to the soil prior to incorporation of the cover crop, microbial biomass was sustained. Jackson suggests that compost may provide a "slow-release" substrate that sustains microbial activity over longer periods than would have been possible with the fresh residue alone. Jackson plans on continuing her research on compost, cover crops, and soil nutrient cycling with recent funding of \$80,000 from the California Integrated Waste Management Board (CIWMB).

LARGE COMMERCIAL GROWERS ARE USING COMPOST

Several large commercial growers are beginning to experiment with compost. Others, like Mike Clay of Whitehills Vineyard, are already convinced of the benefits of compost. Clay spreads 2 tons/acre on every vine row of a 3,000 acre vineyard located in Santa Maria, California, and cites several reasons for his dedication to compost. While he believes that compost increases the soil's water-holding capacity and reduces erosion, one of his primary reasons for using compost is to feed and restore soil microbial populations. Clay tries to time his applications of compost to follow herbicide or fungicide treatments since the compost helps replenish soil microorganisms.

The Salinas Valley's Tanimura & Antle (T & A) is another large grower committed to using compost. Don Cranford of Cranford, Inc. in Spreckels, California has been supplying T & A with compost since 1993. T & A's processing plant is adjacent to Cranford's operation, where he composts vegetable culls from the plant along with yard trimmings, manure and straw. T & A then applies the compost at 3 to 4 tons/acre to its 3,000 plus acres of fields. This progressive grower is committed to sustainable practices and has been participating in Louise Jackson's cover crop/compost study discussed above. T & A also recently merged with Natural Selection, the parent company of Earthbound Farms, which is the nation's largest organic products brand, and will be transitioning some of its acreage to organic in the summer of 2000.

HOW TO INCREASE GROWER INTEREST IN COMPOST

The CIWMB has been taking advantage of the sustainable agriculture movement as an opportunity to market compost and mulch to growers. Compost producers and local government can take similar steps to increase grower interest. These include:

Creating partnerships with agricultural organizations and advisors — Over the past few years, the CIWMB has developed successful partnerships with statewide and regional agricultural organizations. Because growers view these organizations as credible sources of information, the compost message is often better received when it comes from these groups. The CIWMB has teamed with organizations such as the Community Alliance with Family Farmers, the Committee for Sustainable Agriculture, the Central Coast Vineyard Team, several Resource Conservation Districts (RCDs), and several University of California Cooperative Extension farm advisors. In August 1999, the CIWMB approached the RCD of Monterey County about cosponsoring a workshop on increasing organic matter in agricultural soils. The two agencies received a small grant from the Compost Education and Resources for Western Agriculture (CERWA) project and hosted a successful growers workshop. The CIWMB acted solely as a behind-the-scenes facilitator of the event. Tom Lockhart of the RCD served as the moderator and speakers included farm advisors, growers and compost producers.

Before approaching agricultural organizations, it is critical to compile information on local growers dedicated to the use of compost and their specific reasons for using compost. For farm advisors or academics presenting scientific research supports credibility. The USDA will soon be launching a new

feature on its Compost Central Web site — a searchable database of research on compost and mulch. The address for the site is www.barc.usda.gov/nri/smsl/compost.htm

Conduct demonstration/research projects — Most growers do not want to be the first in the neighborhood to try out a new practice. Even though encouraging data exists on the benefits of using compost, most growers want data that is local and specific to the type of crop(s) they are growing. Consequently, demonstration projects that show the benefits of compost and mulch use may encourage more growers to experiment with these products. The CIWMB has sponsored numerous demonstration projects throughout California since 1994 (www.ciwmb.ca.gov/Organics/Processing/Results.htm).

A key to project success is the involvement of farm advisors and local growers on the project team. Follow-up workshops and field days aimed at local growers are key to sharing positive project results.

Understand and be responsive to grower needs — Despite being open to sustainable practices, growers don't necessarily like to make major changes in the way they do business. As marketers of compost, we need to be sensitive to grower needs and demands. Until the recent concerns about pathogens in raw manure, many growers hired manure spreading companies to supply the manure and perform the application. However, many compost producers do not provide spreading services. If a grower does not own the equipment necessary to spread compost, he or she may not purchase the product because of the added inconvenience of renting equipment.

It is also important to recognize that compost acts differently in the soil than raw manure or chemical fertilizers. Conventional growers are accustomed to fertilizers that have a guaranteed amount of nitrogen, phosphorus, and potassium (NPK). Marketers of compost need to help growers interpret lab analyses of compost regarding the bioavailability of nutrients. For example, only 10 to 15 percent of nitrogen is likely to be mineralized (in a plant-available form) during the first year after application. A grower who is relying on compost to provide a specific amount of N may be deficient if this mineralization rate is not considered. And it is unlikely that this grower would return for more compost the following seasons. This is especially important for organic growers who may not be adding any chemical fertilizers.

Note that while some growers use compost as a source of nutrients, the nitrogen content in compost is relatively low compared to commercial fertilizers. When selling compost to a grower, don't focus on the nutritional value. Rather, focus on the other benefits that compost offers, especially the increase of organic matter and the ability to suppress plant pathogens.

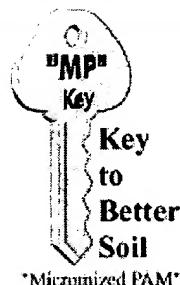
Farmers are willing to invest in compost if they believe it will improve the health of the plants and the productiveness of their crops. Growers who own the land, rather than lease it, are more likely to invest in soil improvement. And because growers see their land as their most valuable asset, they do not want to be seen as a dumping ground for municipal yard trimmings. Avoid using the word "waste" when speaking with farmers. Use terms such as "yard trimmings" rather than "yard waste" and "wood chips" rather than "wood waste" when referring to compost and mulch feedstock.

Creating custom blends of compost may appeal to some growers. For example, a grower may ask for a blend of 75 percent compost and 25 percent gypsum. The grower would then be required to make only one pass in the field as they apply the material.

Learn to think like a farmer — Growers seem to respond to relationship building just as much as they do to solid facts. Learning to think like a farmer helps to build these relationships. Compost producers and marketers who understand the current issues in agriculture, and some of the basics of soil science, have a better chance of communicating to growers.

Sustainable agriculture will continue to grow as farmers discover that environmentally friendly practices can be effective and efficient. Become familiar with the concerns of growers in your area and show them how compost can fit into their sustainable agriculture system.

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Part 1:

Soil Improvement with "MP" (Micronized PAM)

- A. [PAM Facts](#)
- B. [Value of "MP"](#)
- C. [Calcium May Be The Miracle Ingredient](#)
- D. [Summary of Uses of "MP" \(Micronized PAM\)](#)
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A. PAM Facts

"MP" Micronized PAM Fact Sheet

FACT #1: "MP" is a unique formulation of PAM (water-soluble polyacrylamide). mill technology utilizing vibration rather than the crushing action performed by other hammer mill eliminates damage to the product during the grinding process. This allows Soil Enhancement Technologies (SET) to offer a product in a smaller size making it more effective. You can get more particles per square foot than with any other product when applied.

FACT #2: "MP" offers distinctive advantages over other PAM products. Due to the smaller size, you now have alternative application options no other PAM product can offer.

FACT #3: "MP" can be mixed in a water and concentrated ammonium sulfate (CA) solution at a concentration of up to 1/2 pound of "MP" per gallon of water. This means you can now apply the liquid solution directly onto your fields at low volume rates per acre. Since "MP" remains in suspension instead of in solution, you no longer have to worry about bot "thickening" of the mix. This suspension acts and sprays like water! For best results, add the ammonium sulfate to the water and mix until fully dissolved, and then slowly add the "MP" while maintaining agitation. In most cases, the "MP" will go into suspension after just a few minutes of agitation.

FACT #4: "MP" can be injected through a center pivot by adding the material directly to the irrigation system already being applied to the crop during the growing season. Up to 1 pound of "MP" can be added to 10 gallons of most liquid fertilizer blends (calcium salts and inorganic zinc, copper,

are exempted) and injected through the center pivot without the need of special injection. This mixture will slightly thicken the liquid fertilizer but you should experience no problems with the material just as you would your current liquid fertilizer blends. For best results add "MP" to the liquid fertilizer while maintaining without extreme agitation. The use of "MP" is recommended. In most cases, the "MP" will go into solution after just a few seconds. Remember to do a jar test with "MP" and your fertilizer blend to assure compatibility with large quantities.

FACT #5: "MP" offers an alternative to competitive liquid formulation of PAM materials by being able to apply a PAM material without worrying about special equipment or formulation problems!

FACT #6: "MP" Offers a variety of ways for application of dry particles to soil for lawns and gardens.

FACT #7: "MP" is only available from Soil Enhancement Technologies:

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B. Values of "MP"

Good soil is extremely important in growing our food and in creating a pleasant environment. But soil, generally is very unfriendly. Poor soil variously relates to infertility, little or no organic matter, poor physical characteristic of the soil. Infertility can be corrected by providing more organic matter. Organic matter can be corrected by use of crop residues and composts and related materials. Soil biology can be corrected by use of crop residues and composts and related materials. Far too little attention is given to the third problem concerning the physical characteristics of the soil.

The physical aspects of soil can be unfriendly in many ways. Soil can be poorly drained, it can be waterlogged, it can be hard or cracked and difficult to till. It may not permit roots to penetrate the soil easily because of crusting of the soil surface. Also the soil may be very susceptible to erosion by water or wind. Too often, sediments are washed from the land that contain nutrients and even unwanted microbes. These sediments can cause many problems of environmental pollution.

Water-soluble polymer soil conditioners are the answer to many of the problems of poor soil. The most common polymer in use is polyacrylamide abbreviated to PAM. It is in a water-soluble form and not to be confused with another polymer that is cross-linked. The water-soluble form reacts with the clay in soil to flocculate it into larger particles, creating better aeration, better water movement, less erodible soil, easily tillable soil and other characteristics. Good soil texture results to give loose, separate and crumbly soil. Cross-linked polymers absorb water but do not react with clay.

Water-soluble PAM does improve soil. Some of the advantages are:

- Less packing and cracking of soil
- Less soil erosion
- More efficient water use
- More efficient fertilizer use
- Better tillability of soil
- Better survival and growth of plants
- Less dust (PM_{10} and $PM_{2.5}$)
- Enhanced value of organics and other soil amendments
- Less soil crusting with more and faster seed emergence
- Easier weed removal
- Better soil aeration to improve root growth
- More crop yield
- Fewer soil-borne diseases
- Better success when irrigating with reclaimed water
- Cleaner harvest of root crops
- Less compacted soil
- Less muddy soil
- A perfect bed for sod or seeds
- Earlier crop maturity
- Decrease the effects of too much clay

The ability of PAM to improve soil is tremendous. Also one must remember treatment or application does not necessarily give all the benefits simultaneously. It requires different activities.

Micronized PAM "MP" is a form of PAM that is reduced to very small particles that does not decrease its effectiveness. Micronized PAM has two major advantages

are reduced in diameter to as many as 1000 times and sometimes more. This has the advantage of tilling into soil many more particles per unit of soil than with regular commercial PAM. Efficiency increases to make a pound of PAM at least five times more effective compared to PAM when they are applied dry. It can be more cost effective to be more useful.

The reason why small particles are more effective than large particles is that when dissolved they tend to migrate only a short distance from the point of application fixed to the clay. Small particles allow for more uniform distribution into soil including dissolved.

When applied as solutions, "MP" is rapidly soluble. Solution time can be reduced from 90 minutes to a matter of seconds compared with the commercial size. Perhaps the widespread use of PAM is its difficulty for putting into solution. "MP" solves this problem.

Some specific uses for "MP" Micronized PAM (some use of gypsum is recommended with all):

- Preparation of seed beds
- Reduce erosion- wind and dust to prevent movement of sediment containing nutrients and other matter
- Facilitate success in transplanting shrubs and trees and even vegetable transplants
- As a tackifier in hydroseeding
- Hasten earlier seed emergence and hasten earlier maturity
- Enhance water penetration, deeper rooting and to decrease water runoff
- Facilitate clean harvest of root and tuber crops
- In irrigation furrows to prevent soil erosion
- Make soil reclamation more effective- even make it possible to overcome much excess exchangeable sodium in soil
- With gypsum, overcome the problems with irrigation with reclaimed water

Some ways for using Micronized PAM

- In a slurry in concentrated ammonium sulfate to be diluted with water (irrigation)
- In calcium solution for dilution with irrigation water
- In fertilizer solution for dilution with irrigation water
- In dry, blended with ammonium sulfate and sometimes also with potassium sulfate for application, for hydroseeding, for soil preparation.

Micronized PAM is food grade and meets all requirements for use in soil: high molecular weight.

or more anionic and residual monomer less than 0.05%.

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C. Calcium May Be The Miracle Ingredient

There are over 30 different reasons why calcium in the form of gypsum is beneficial.

Stable soil organic matter has fairly constant Carbon-Nitrogen (C:N) and carbon-sulfur (C:S) ratios. Little is known about the relationship of soil organic matter with calcium, that has been reported to be important to the stabilization of the organic matter to the clay. This is the case for the polysaccharide macromolecules that stabilize soil aggregates. Calcium additions with organic matter are necessary to retain organic matter. Albrecht reported that liberal supplies of calcium in soil and liberal stocks of organic matter are inseparable. Use of calcium helps build up the supply of soil organic matter in ways which calcium sources are usually added to soil. Calcium supplied as gypsum or lime can increase the efficiency of accumulation of soil organic matter. PAM, calcium (gypsum) when used together.

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D. Summary of Uses of "MP" (Micronized PAM)*

The benefits are usually with other additives (often with calcium and organics)

Farm

- Anticrusting agent
- Improve soil aeration and drainage so that plants root deeper
- Decrease wind and water erosion (simultaneously prevent fertilizer and pesticide runoff)
- Improve water infiltration into soil
- Clarify muddy water
- Help in water conservation
- Improve soil surface for minimum tillage
- Advance planting date 1 or 2 weeks because soil dries faster
- Make organic and mineral amendments more effective
- Decrease the time to crop maturity
- Increase crop yields and quality
- Increase water-use efficiency and nutrient-use efficiency
- Cleaner harvest of below ground crops

Landscaping

- Soil preparation for turf and plantings
- Improve water penetration into soil
- Decrease erosion
- Protect soil surface while seeds germinate on slopes
- Transplant aid
- Improve soil texture
- Mellow clay soil and subsoil

- Decrease sticky mud and soil crusting
- Improve value of added organics
- Help upgrade subsoil to topsoil
- As a tackifier in hydroseeding
- Water Conservation

Home Gardening

- Allow for deeper root penetration
- Less erosion of soil and nutrients
- Save water
- Soil preparation made easier
- Make potting soil
- Make planter beds
- Make friable soil that is easy to cultivate
- Improve soil drainage
- Aid in transplanting
- Decrease soil crusting
- Improve value of added organic matter, mineral amendments, and fertilizers
- Make earlier cultivation possible
- Hasten crop maturity

Environment

- Dust control
- Renovation of disturbed lands
- Control of clay in settling ponds
- Slope stabilization and protection slope
- Protect rivers and streams from pesticide and fertilizer runoff from farms
- Water Conservation
- Water erosion control
- Improve stability of landscape
- Enhance ecosystem approach to farming and gardening

* Different uses usually require different application procedures

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E. Examples of Yield Increases that have been Reported

(Note that different results will be obtained for different conditions and different use sometimes, yield may not be increased even though there are other improvements.)

- Potato yield was increased by 25%.
- Tomato yield was increased by 14%, 79%, and 154%.
- Strawberry yield was increased by 100%.
- Cotton yield was increased by 10%.
- Garlic yield was increased by 10%.
- Carrot yield was increased by 12%.
- Onion yield was increased by 10%.
- Lettuce yield was increased by 8%, 17%, and 25%.

- Field corn yield was increased by 44%.
- Cucumber yield was increased by 14%.

Actually for too little data have been collected to date on PAM or "MP" increasing yields. Much available has not been obtained through rigorous experimentation, which is costly, but will tell a powerful story. Yield increases can logically be expected when there is better water infiltration, better soil aeration or when there is more and earlier seed emergence. All the best management practices have the value of each other to make a better whole.

At the rates PAM is applied for control of furrow irrigation, yield increases really should not be expected. Yield increases can occur under favorable conditions that enhance water-use efficiency. One can obtain quality results without yield increases. Multiple values from the use of PAM can be obtained.

Even though yield increases are often, but not always, obtained they are most likely to occur when the chosen application method and rate has a chance to result in higher yields. Methodology for various purposes is outlined below.

Considerable effort was expended over 45 years ago concerning water-soluble polymers or PAM. Those results follow in Section G. The results are valid today even though the polymer application methodology is different. The data reproduced here in Section G are from *Soil Science* 73:419-492(1952).

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F. Products of Micronized PAM

a. CAS-PAM – garden, landscape, and farm

- 1 gallon for erosion control per acre in irrigation furrows
- 1 gallon for dust control per acre if sprinkled
- 1-2 gallons per 1000 ft² for soil preparation
- 1 gallon for home miscellaneous use with soil
- Multiple gallons for farm improvement
- 1-2 gallons per acre can prevent crusting

b. 25-pound (or 20) package of -150 or smaller MP (50 pound of solution-grade gypsum added simultaneously as directed).

	<u>Micronized PAM</u>	<u>Gypsum</u>
• Transplanting	1-2 lb/1000 gallon	3 pounds
• Erosion control	0.05 lb/1000 gallon	3 pounds
• Hydroseeding	1-2 quarts/1000 gallon	1-2 quarts

- Fertilizer stock solution 83-100 pounds/1000 gallons none
Stock solution for later dilution into irrigation.
- c. 25% in -270 in 50% ammonium sulfate and 25% potassium sulfate in 25 pound pounds solution grade gypsum as per direction
 - 4-20 pounds per 1000 ft² spread dry for soil preparation. Ten pounds gypsum 1 separately.
 - 10-50 or more pounds may be added per acre via a Herd Feeder or equivalent for improvement. One half to a ton of gypsum may be spread separately.
- d. A 10% blend of Micronized PAM in ammonium sulfate, mono ammonium phosphate sulfate and iron EDDHA is used as garden preparation procedure and for prevention of deficiency. Do not use gypsum or sulfate of iron, zinc, or copper in the blend.
- e. Micronized PAM is blended with some fertilizers for soil improvement and can chelates for prevention and correction of iron deficiency.

Remember "MP" PAM also means "More Power".

Sizes of "MP" (Micronized PAM)*

80 mesh = about 210 microns -35**
100 mesh = about 175 microns -61
150 mesh = about 90 microns -445
270 mesh = about 50 microns -2594
-270 mesh = about 30 microns -about 12,000

* 25,400 microns make an inch. A micron is one millionth of a meter.

** Number of particles per pound of soil if one pound is used per acre-six

Note: 35 mesh PAM is about 500 microns with about 4.5 particles per pound soil

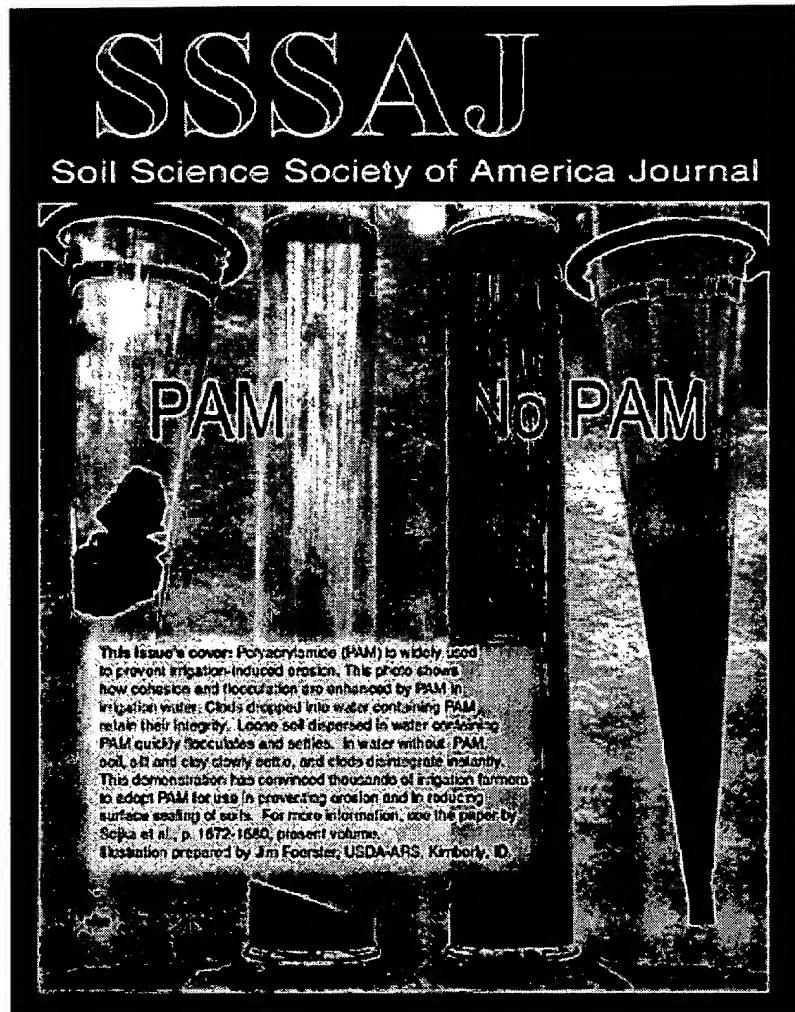
Note: 25 mesh PAM is about 700 microns with about 1.0 particles per pound soil (acre six-ii)

"MP" (Micronized PAM) meets all requirements as an acceptable soil conditioner (molecular weight, concentration of residual monomer). It is food grade also.

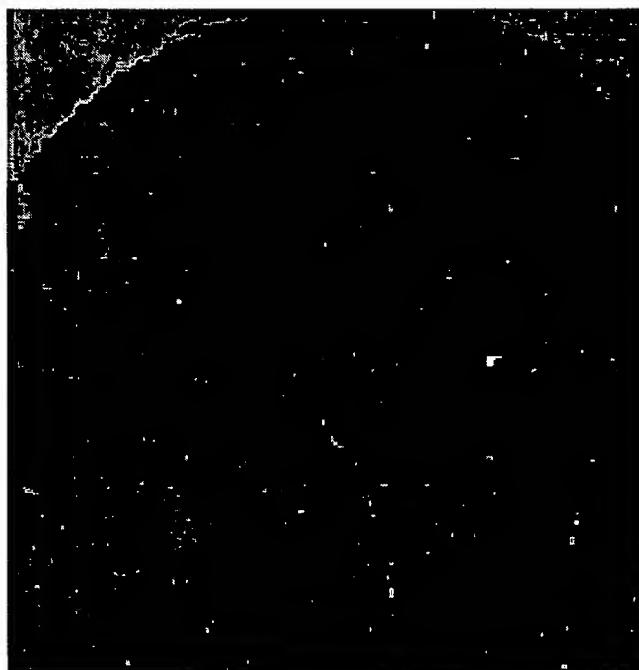
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G. Picture and Table Section (Including Krilium)

1. Soil Science Society of America

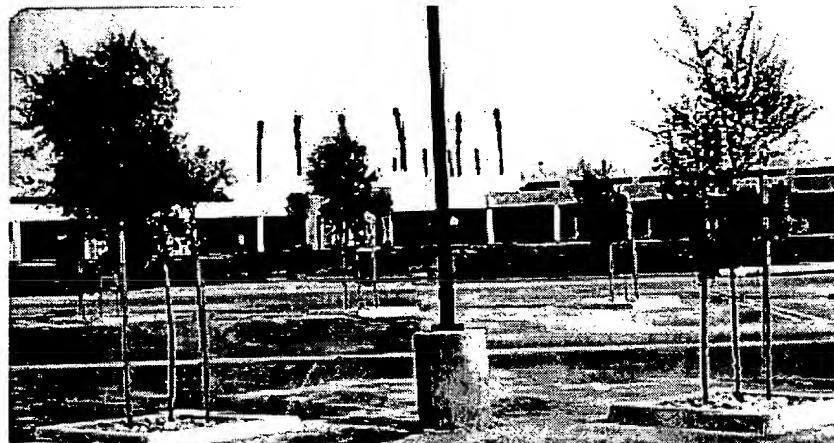


2. Center Pivot Potato field



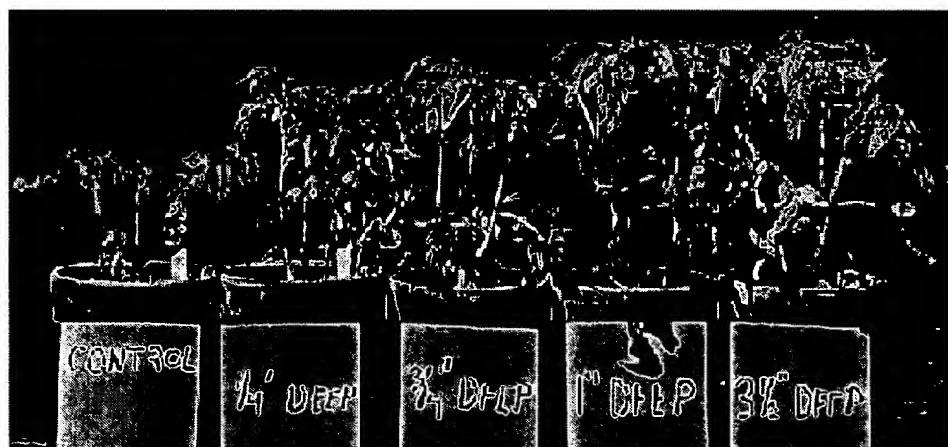
Infrared picture of a 125 acre (50 hectare) center-pivot potato field taken just before half had 3 pounds PAM per acre in the first irrigation after planting and the top half the first irrigation. The bottom half gave 25% more yield than the control.

3. Elm tree transplants



Fifty uniform elms were planted February 1987 at Tri-City Center at San Bernadino Riverside. A dozen elms were backfilled with the standard, 40 percent nitrogen-stabilized compost amended soil. The balance were planted with the PAM in the backfill in conjunction with the same redwood compost but with only half as much appearance are shown in the picture (in Part 1) at the 3-month point. Notice the second row of elms in comparison to the roof line. Within a few weeks of planting, growth was noted. At the 2-month point, the polymer-treated trees were already a foot taller with compost only treated elms. At the 5-month point, the PAM treated elms were two feet taller. There is still a big difference. Some of the elms were transplanted the year prior to 1987. Most of the balance of the elms were planted in February except for a few which can be seen in front of the building entrance. The growth rate for the polymer soil is about four times faster than for the imported soil. The caliper sizes for the polymer are about the same even though the elms planted with the imported soil have been compared to redwood compost alone, the PAM is excellent in promoting new growth on trees.

4. PAM depth treatment



With use of the solution application, PAM can be confined easily to precise depths applied if soil has been cultivated. The 'effect of depth' of treatment on growth of granular PAM was used here.

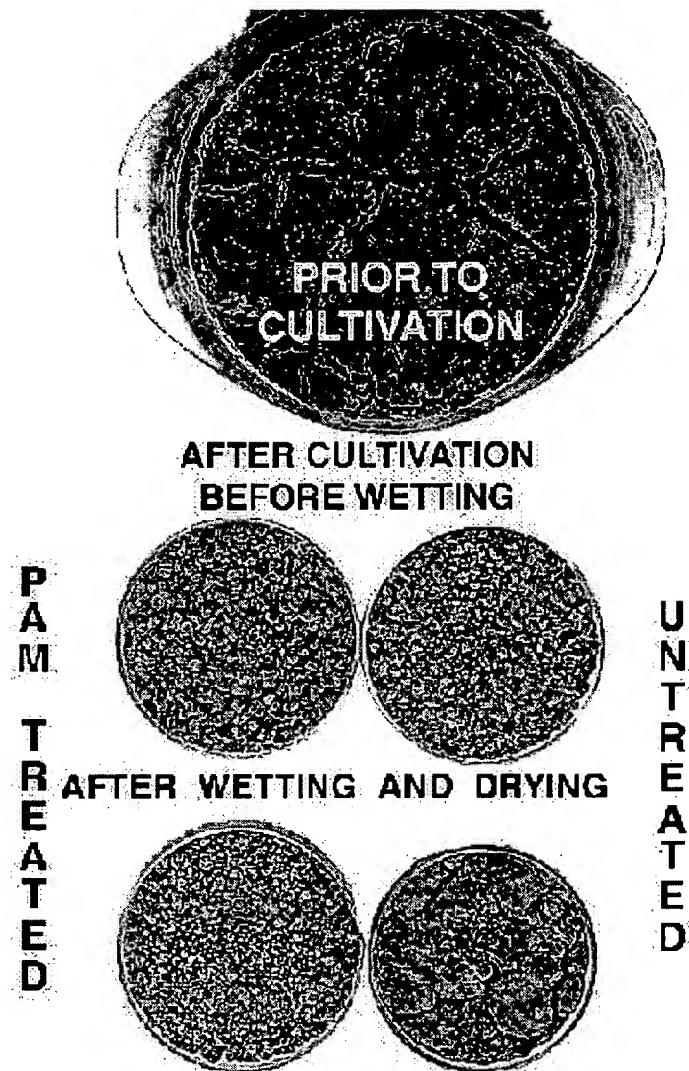
5. Seedling emergence

Number of tomato and lettuce seedlings of 36 that emerged from the Imperial Valley, California soil with and without PAM applied to soil in solution (2 lbs per acre)

Day No.	Without PAM	With PAM
No. seedlings: Tomato		
9	0	0
13	5	9
18	9	16
24	20	24
No. seedlings: Lettuce		
4	0	0
7	0	9
9	5	18
22	12	27
Dry wt. of seedlings (mg/plant)		
Tomato (24 days)	6.3	12.8
Lettuce (22 days)	4.5	8.0

PAM in sprinkler irrigation right after seeds are planted and before rain or irrigation can very crust, aid seed emergence and increase early growth of seedlings and advance date of crop may be sprinkled after the PAM solution is dried if the surface is too dry for seed emergence.

6. PAM treated soil maintains tillability



7. Strawberry plants where yield was doubled



Strawberry plants grown in untreated beds on the left, treated beds on the right with water-soluble PAM produced a 75 percent increase in soil aeration and doubled yield.

8. Lateral water movement with PAM in irrigation (right has no PAM)



[Click here to see this picture in more detail.](#)

Courtesy of Floeger

9. Friendly Krilium back in 1952.



A seed is a lot like a child. To grow up and fulfill the promise it holds start in life, in soil that provides the proper "home" environment ... Seeds naturally "unfriendly." They are poorly structured. They pack, cake and out and often get hard as a brick during the normal rain and sun of the year. Naturally, seeds can't do so well in "problem" soil like this. In fact, they choke off and never come up. Krilium changes such problem soil--maintains them in loose, separated, crumbly particles--greatly aiding germination, strong root formation and freer emergence... In a word, it's Friendly Soil! Try it! See the difference in your garden when plants begin to grow.

10. The Krilium experiments 45 years ago. Results were valid - today PAM is a soil conditioner; 10 to 100 times lower rates are needed; application methods are different.

Some results with a water-soluble polymer soil conditioner used in 1952. The results are valid today. That is why they are here. But the PAM materials in use today are far superior to those of 1952 and much lower application rates are needed now to get similar results. Application methods are different today and that can increase efficiency of the water-soluble PAM. The polymers labeled as CRD 186, CRD 189 and CI are called by the trade name Krilium. The results obtained with PAM today. It is not necessary that the results must be the same. The methodology are different, but the results are similar. The Methodology of today is more consistent. See reference Soil Science 1952.

[Click here for more results on use of Krilium. They are still good.](#)

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H. Click Here to See Some of Your Questions with Answers

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I. References (Click on title of the book for contents)

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[Soil Science](#), June 1952, Volume 73: 419 - 492 - Special Issue-Synthetic

[Soil Science](#), May 1986, Volume 141: 311 - 398 - Special Issue on Polyme

[Soil Science](#), October 1994, Volume 158: 233 - 300 - PAM for Contr

[http://kimberly.ars.usda.gov/WebErode.html](#) (Important information on control of erosion wi on the properties of PAM.)

[http://www.wallace-labs.com](#)

[http://www.bettersoils.com](#)

[www.soilfoodweb.com](#)

Gypsum Suppliers:

[http://www.awgypsum.co](#) -- Art Wilson Co. in Carson City, NV

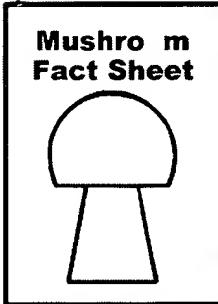
[http://www.diamondkgypsum.com](#) -- Diamond K Gypsum in Richfield, UT

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Spent Mushroom Substrate

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SPENT MUSHROOM SUBSTRATE FACT SHEET

Spent mushroom substrate is the soil-like material remaining after a crop of mushrooms. Spent substrate is high in organic matter making it desirable for use as a soil amendment or soil conditioner. Sometimes this material is called spent mushroom compost. This fact sheet briefly explains mushroom growing, so that the reader knows what is in the prepared substrate, and then describes the characteristics and possible uses of the material.

Mushroom Growing

Substrate prepared specifically for growing mushrooms is a blend of natural products. Common ingredients are wheat straw bedding containing horse manure, hay, corn cobs, cottonseed hulls, poultry manure, brewer's grain, cottonseed meal, cocoa bean hulls and gypsum. Growers may add ground soybeans or seed meal supplements later in the production cycle. On top of the substrate, farmers apply a "casing" layer, which is a mixture of peat moss and ground limestone. The casing material provides support for the growing mushrooms.

Spent mushroom substrate still has some nutrients available for the mushroom; however, it is more economical to replace the substrate and start a new crop. Before removing the spent substrate from the mushroom house, the grower "pasteurizes" it with steam to kill any pests or pathogens that may be present in the substrate and casing. This final pasteurization kills weed seeds, insects, and organisms that may cause mushroom diseases. Users may consider spent substrate clean of weed seeds and insects.

Mushroom growers sometimes apply a registered pesticide during the crop cycle. The local garden center sells most of the same pesticides a mushroom farmer uses. Even if pesticides have been applied, they are generally hard to find for two reasons. Organic matter in the substrate effectively binds pesticides. Also, these compounds decompose rapidly at the high temperatures used for pasteurizing the completed crop. It is safe to assume that the pesticide residue on spent substrate is low. Some farms are strictly "organic" and will not use chemical pesticides. These farms can be identified by contacting your Cooperative Extension office.

Characteristics of Spent Mushroom Substrate

The typical composition of spent mushroom substrate fresh from a mushroom house will vary slightly. Since raw materials and other cultural practices change, each load of fresh spent substrate has a slightly different element and mineral analysis. Therefore the characteristics shown in Table I indicate a range of values for each component. Sometimes, fresh substrate is placed in fields for at least one winter season and then marketed as "weathered" mushroom soil. This aged material has slightly different characteristics because the microbial activity in the field will change the composition and texture. The salt content may change during the aging period. If you have any specific questions concerning characteristics of either fresh

or aged spent substrate, please contact your local Cooperative Extension agent.

Appropriate Uses of Spent Substrate

There are many appropriate uses for spent mushroom substrate. Spent mushroom substrate is excellent to spread on top of newly seeded lawns. The material provides cover against birds eating the seeds and will hold the water in the soil while the seeds germinate. Since some plants and garden vegetables are sensitive to high salt content in soils, avoid using fresh spent substrate around those plants. You may use spent substrate weathered for 6 months or longer in all gardens and with most plants. Obtaining spent substrate in the fall and winter, allowing it to weather, will make it ready to use in a garden the following spring. Spring and summer are the best time to use weathered material as a mulch.

As a soil amendment, spent substrate adds organic matter and structure to the soil. Spent substrate primarily improves soil structure and it does provide a few nutrients. Spent substrate is the choice ingredient by those companies making the potting mixtures sold in supermarkets or garden centers. These companies use spent substrate when they need a material to enhance the structure of a soil.

AVERAGE ANALYSIS of SPENT MUSHROOM SUBSTRATE			
Contents	Units	Avg. Fresh	Weathered 16 mos.
Sodium, Na	% Dry Wt.	0.21 - 0.33	0.06
Potassium, K	% Dry Wt.	1.93 - 2.58	0.43
Magnesium, Mg	% Dry Wt.	0.45 - 0.82	0.88
Calcium, Ca	% Dry Wt.	3.63 - 5.15	6.27
Aluminum, Al	% Dry Wt.	0.17 - 0.28	0.58
Iron, Fe	% Dry Wt.	0.18 - 0.34	0.58
Phosphorus, P	% Dry Wt.	0.45 - 0.69	0.84
Ammonia-N, NH4	% Dry Wt.	0.06 - 0.24	0.00
Organic Nitrogen	% Dry Wt.	1.25 - 2.15	2.72
Total Nitrogen	% Dry Wt.	1.42 - 2.05	2.72
Solids	% Dry Wt.	33.07 - 40.26	53.47
Volatile Solids	% Dry Wt.	52.49 - 72.42	54.24
pH	Standard Units	5.8 - 7.7	7.1
N-P-K ratio	PPM Dry Wt.	1.8 - 0.6 - 2.2	2.7 - 0.8 - 0.47
% x 10,000 = PPM			



Penn State Department of Plant Pathology

Mushroom Research Laboratory

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University Park, PA 16802

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EMail requests for information about the laboratory and mushroom research programs to MushroomSpawnLab@psu.edu

Version 1.04 last modified on November 20, 1999

This Web page maintained by Vija.Wilkinson@psu.edu.

show files;ds
 File 350:Derwent WPIX 1963-2001/UD,UM &UP=200206
 (c) 2002 Derwent Info Ltd
 File 344:CHINESE PATENTS ABS APR 1985-2001/Dec
 (c) 2002 EUROPEAN PATENT OFFICE
 File 347:JAPIO OCT 1976-2001/Sep(UPDATED 020102)
 (c) 2002 JPO & JAPIO
 File 371:French Patents 1961-2002/BOPI 200204
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Set	Items	Description
S1	736	AU="YAMASHITA T" OR AU="YAMASHITA T T"
S2	2	S1 AND MICROBIAL?
S3	146883	MICROBE? ? OR MICROBIAL? OR MICROORGANISM? OR MICRO()ORGANISM?
S4	2811816	COMPSN OR COMPSNS OR COMPOSITION? OR CPD OR CPDS OR COMPOUND? OR BLEND? OR MIXTURE?
S5	16636	PESTICIDE?
S6	2862	S3 (3N) S4
S7	41	S6 AND S5
S8	41	S7 NOT AD=001023
S9	0	S S6 AND SOIL?
S10	2861	S3 AND S4 AND SOIL?
S11	2266232	APPLIED? OR APPLICATION? OR SPREAD? OR APPLY OR MIXIN OR MIXED?
		IX
S12	3382	S11 (3N) SOIL
S13	116	S12 AND S3 AND S4
S14	84	S13 AND (PLANT? OR CROP? OR PEST?)
S15	11	S12 AND S6
?		

2/7/1 (Item 1 from file: 350)

DIALOG(R)File 350:Derwent WPIX

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014172921

WPI Acc No: 2001-657149/200175

Aqueous composition useful for enhancing mineral content of a plant comprises a mineral component and a source of a chelating agent

Patent Assignee: YAMASHITA T T (YAMA-I)

Inventor: **YAMASHITA T T**

Number of Countries: 094 Number of Patents: 001

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
WO 200177044	A1	20011018	WO 2001US10984	A	20010404	200175 B

Priority Applications (No Type Date): US 2000543449 A 20000405

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
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WO 200177044	A1	E	21	C05F-011/00	
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Designated States (National): AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK DM DZ EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT TZ UA UG UZ VN YU ZA ZW

Designated States (Regional): AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ NL OA PT SD SE SL SZ TR TZ UG ZW

Abstract (Basic): WO 200177044 A1

NOVELTY - An aqueous mineral composition comprises a plant nutrient mineral component (3 - 15, preferably 4 - 12, especially 5 - 10)% and/or source of at least one naturally occurring chelating agent.

ACTIVITY - Pesticidal; Fertilizer.

MECHANISM OF ACTION - None given.

USE - In enhancing the nutrient mineral content of a plant (claimed), in pest control and in disease control.

ADVANTAGE - The composition is simple, easy to produce and provides significant improvement in terms of plant health and growth rate and increasing fruit size, enhancing fruit quality, pest control and disease control. The composition is made of a natural product and does not pose health risk to humans or livestock.

pp; 21 DwgNo 0/0

Derwent Class: C04

International Patent Class (Main): C05F-011/00

2/7/2 (Item 2 from file: 350)

DIALOG(R)File 350:Derwent WPIX

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013293652

WPI Acc No: 2000-465587/200040

Aqueous compositions contain predisposing agent, carbon-skeleton energy component and vitamin co-factor, used to amend soil by e.g. enhancing indigenous microbe population, enhancing mineral-release

Patent Assignee: YAMASHITA T T (YAMA-I)

Inventor: **YAMASHITA T T**

Number of Countries: 090 Number of Patents: 003

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
WO 200038513	A1	20000706	WO 99US29725	A	19991214	200040 B
AU 200020539	A	20000731	AU 200020539	A	19991214	200050
US 6187326	B1	20010213	US 98222459	A	19981229	200111

Priority Applications (No Type Date): US 98222459 A 19981229

Patent Details:

Patent No Kind Lan Pg Main IPC Filing Notes

WO 200038513 A1 E 22 A01N-003/02

Designated States (National): AE AL AM AT AU AZ BA BB BG BR BY CA CH CN
 CR CU CZ DE DK DM EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP
 KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX NO NZ PL PT RO RU SD SE
 SG SI SK SL TJ TM TR TT TZ UA UG UZ VN YU ZA ZW

Designated States (Regional): AT BE CH CY DE DK EA ES FI FR GB GH GM GR
 IE IT KE LS LU MC MW NL OA PT SD SE SL SZ TZ UG ZW

AU 200020539 A A01N-003/02 Based on patent WO 200038513

US 6187326 B1 A01N-025/00

Abstract (Basic): WO 200038513 A1

NOVELTY - Aqueous compositions comprise:

- (a) a predisposing agent;
- (b) a carbon-skeleton energy component; and
- (c) a vitamin co-factor.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for a method for amending soil by applying the above described composition

ACTIVITY - Soil amending; pathogen control; pesticide; toxin neutralization; toxin degradation; soil improving; soil fertility improving. The ability of test compound to enhance indigenous microbe populations was examined in inactive soil with low **microbial** activity treated with Standard Mix (50 gpa) and Enhanced Mix (50 gpa) and irrigated to incorporate the materials. Standard Mix contained (weight/weight %): Hi-Brix Molasses (RTM: molasses) (35), calcium lignosulfate (35), gallic acid (0.1), yeast extract (2.5) and water (27.5). Enhanced Mix contained (weight/weight %): Hi-Brix Molasses (RTM: molasses) (32), calcium lignosulfate (32), urea (5), potassium nitrite (3.8), phosphoric acid (3.4), hydrate zinc sulfate (0.8), hydrated iron sulfate (0.8), hydrated magnesium sulfate (0.8), vitamin B complex (1.0) and water (20.4). Approximately 120 hours after treatment soil samples were secured and processed for examination of bacterial populations through dilution plating. Five replications were performed per treatment. The total population (millions of colony-forming units/g of soil) were 7.5 for control, 1,450 for Standard Mix and 3,000 for Enhanced Mix, with mean values of 1.5, 290 and 600, respectively.

MECHANISM OF ACTION - None given.

USE - The compositions are used to amend soil by enhancing the indigenous microbe population of the soil, enhancing the mineral-release ability of the soil, reducing disease inoculum present in the soil, reducing the parasitic nematode population in the soil, enhancing water filtration through the soil and/or enhancing the fertility of the soil (claimed). They may be used to control soil-borne pests or pathogens, neutralize and/or degrade toxins, improve soil characteristics such as water permeability, improve soil fertility, mellow soil textural qualities, enhance the decomposition of plant tissues, accelerate degradation of potentially toxic chemicals and/or allelopathic chemicals and improve the root mass in plants grown in treated soil. They may be used to control pests including plant parasitic nematodes, phylloxera and grubs, and pathogens including pathogenic fungi, actinomycetes, bacteria and viruses as well as increasing indigenous soil microbe populations including bacteria, fungi, actinomycetes and various free-living invertebrates.

pp; 22 DwgNo 0/0

Derwent Class: C03; C04

International Patent Class (Main): A01N-003/02; A01N-025/00

International Patent Class (Additional): A01N-063/00; A61K-035/00;

C05F-011/08; C05G-003/00; C05G-003/02

?

15/7/1 (Item 1 from file: 350)

DIALOG(R) File 350:Derwent WPIX

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013707307

WPI Acc No: 2001-191531/200119

Producing bacterial, *Pasteuria endospores* in vitro, useful in nematode control programs, comprises growing bacteria in growth medium with helper factor such as **microorganism** or chemical **compound** produced by a **microorganism**

Patent Assignee: ENTOMOS LLC (ENTO-N)

Inventor: GERBER J F; WHITE J H

Number of Countries: 094 Number of Patents: 002

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
WO 200111017	A2	20010215	WO 2000US21942	A	20000810	200119 B
AU 200066323	A	20010305	AU 200066323	A	20000810	200130

Priority Applications (No Type Date): US 99148154 P 19990810

Patent Details:

Patent No Kind Lan Pg Main IPC Filing Notes

WO 200111017 A2 E 24 C12N-003/00

Designated States (National): AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CR CU CZ DE DK DM DZ EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT TZ UA UG US UZ VN YU ZA ZW

Designated States (Regional): AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ NL OA PT SD SE SL SZ TZ UG ZW

AU 200066323 A C12N-003/00 Based on patent WO 200111017

Abstract (Basic): WO 200111017 A2

NOVELTY - Producing (M1) bacterial endospores in vitro comprising growing the bacteria in a growth medium containing a helper factor such as a **microorganism** or a chemical **compound** produced by a **microorganism**, which promotes the growth of the bacteria, is new.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the following:

(1) producing *Pasteuria endospores* (M2) in vitro comprising growing the *Pasteuria* in a growth medium and obtaining the endospores;

(2) a compound (I) designated HF-1 which facilitates the in vitro growth of *Pasteuria* and which is less than 50 μ m in size;

(3) a biologically pure culture (II) of motile rod organisms associated with the ability of *Pasteuria* to grow in vitro; and

(4) an endospore composition produced by (M2).

ACTIVITY - Nematocide. No supporting data is given.

MECHANISM OF ACTION - None given.

USE - The helper factors (I) or (II) are useful for protecting a plant from infection by nematodes which involves applying to the plant, or to the plant's surroundings, a helper factor which promotes the colonization or proliferation of a bacterial nematode biocontrol agent. The helper factor as described above is **applied** to the **soil** or as a seed coating. Alternately, the plant which is transformed to express the helper factor in the roots, produces the helper factor (claimed). The helper factors are useful to promote efficient colonization and/or infectivity by *Pasteuria*. The bacterial spores produced by the above method can then be used in nematode control programs.

ADVANTAGE - *Pasteuria* can be grown in vitro, without the presence of a host (nematode) tissue. The process is highly simple and reduces material and labor cost. The method results in the growth of bacterial mass and an increase in the number of cellular units of the vegetative stage of the bacteria. The method requires simple growth media and no nematode tissue.

pp; 24 DwgNo 0/0
 Derwent Class: C06; D16; P13
 International Patent Class (Main): C12N-003/00
 International Patent Class (Additional): A01H-005/00; A01N-063/00;
 C12N-001/20; C12P-001/04

15/7/2 (Item 2 from file: 350)
 DIALOG(R)File 350:Derwent WPIX
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013293652
 WPI Acc No: 2000-465587/200040

Aqueous compositions contain predisposing agent, carbon-skeleton energy component and vitamin co-factor, used to amend soil by e.g. enhancing indigenous microbe population, enhancing mineral-release

Patent Assignee: YAMASHITA T T (YAMA-I)

Inventor: YAMASHITA T T

Number of Countries: 090 Number of Patents: 003

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
WO 200038513	A1	20000706	WO 99US29725	A	19991214	200040 B
AU 200020539	A	20000731	AU 200020539	A	19991214	200050
US 6187326	B1	20010213	US 98222459	A	19981229	200111

Priority Applications (No Type Date): US 98222459 A 19981229

Patent Details:

Patent No Kind Lan Pg Main IPC Filing Notes

WO 200038513 A1 E 22 A01N-003/02

Designated States (National): AE AL AM AT AU AZ BA BB BG BR BY CA CH CN CR CU CZ DE DK DM EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT TZ UA UG UZ VN YU ZA ZW

Designated States (Regional): AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW NL OA PT SD SE SL SZ TZ UG ZW

AU 200020539 A A01N-003/02 Based on patent WO 200038513

US 6187326 B1 A01N-025/00

Abstract (Basic): WO 200038513 A1

NOVELTY - Aqueous compositions comprise:

- (a) a predisposing agent;
- (b) a carbon-skeleton energy component; and
- (c) a vitamin co-factor.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for a method for amending soil by applying the above described composition

ACTIVITY - Soil amending; pathogen control; pesticide; toxin neutralization; toxin degradation; soil improving; soil fertility improving. The ability of test **compound** to enhance indigenous **microbe** populations was examined in inactive soil with low microbial activity treated with Standard Mix (50 gpa) and Enhanced Mix (50 gpa) and irrigated to incorporate the materials. Standard Mix contained (weight/weight %): Hi-Brix Molasses (RTM: molasses) (35), calcium lignosulfate (35), gallic acid (0.1), yeast extract (2.5) and water (27.5). Enhanced Mix contained (weight/weight %): Hi-Brix Molasses (RTM: molasses) (32), calcium lignosulfate (32), urea (5), potassium nitrite (3.8), phosphoric acid (3.4), hydrate zinc sulfate (0.8), hydrated iron sulfate (0.8), hydrated magnesium sulfate (0.8), vitamin B complex (1.0) and water (20.4). Approximately 120 hours after treatment soil samples were secured and processed for examination of bacterial populations through dilution plating. Five replications were performed per treatment. The total population (millions of colony-forming units/g of soil) were 7.5 for control, 1,450 for Standard Mix and 3,000 for Enhanced Mix, with mean values of 1.5, 290

and 600, respectively.

MECHANISM OF ACTION - None given.

USE - The compositions are used to amend soil by enhancing the indigenous microbe population of the soil, enhancing the mineral-release ability of the soil, reducing disease inoculum present in the soil, reducing the parasitic nematode population in the soil, enhancing water filtration through the soil and/or enhancing the fertility of the soil (claimed). They may be used to control soil-borne pests or pathogens, neutralize and/or degrade toxins, improve soil characteristics such as water permeability, improve soil fertility, mellow soil textural qualities, enhance the decomposition of plant tissues, accelerate degradation of potentially toxic chemicals and/or allelopathic chemicals and improve the root mass in plants grown in treated soil. They may be used to control pests including plant parasitic nematodes, phylloxera and grubs, and pathogens including pathogenic fungi, actinomycetes, bacteria and viruses as well as increasing indigenous soil microbe populations including bacteria, fungi, actinomycetes and various free-living invertebrates.

pp; 22 DwgNo 0/0

Derwent Class: C03; C04

International Patent Class (Main): A01N-003/02; A01N-025/00

International Patent Class (Additional): A01N-063/00; A61K-035/00;

C05F-011/08; C05G-003/00; C05G-003/02

15/7/3 (Item 3 from file: 350)

DIALOG(R) File 350:Derwent WPIX

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012890185

WPI Acc No: 2000-062019/200005

A novel antifungal bacteria Lytobacter mycophilus used for biological control of fungal diseases in plants

Patent Assignee: UNIV RUTGERS STATE NEW JERSEY (RUTF)

Inventor: HOLTMAN M A; KOBAYASHI D Y

Number of Countries: 086 Number of Patents: 002

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
WO 9955833	A2	19991104	WO 99US9032	A	19990427	200005	B
AU 9936660	A	19991116	AU 9936660	A	19990427	200015	

Priority Applications (No Type Date): US 9883119 P 19980427

Patent Details:

Patent No Kind Lan Pg Main IPC Filing Notes

WO 9955833 A2 E 117 C12N-000/00

Designated States (National): AE AL AM AT AU AZ BA BB BG BR BY CA CH CN CU CZ DE DK EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MD MG MK MN MW MX NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT UA UG US UZ VN YU ZA ZW

Designated States (Regional): AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW NL OA PT SD SE SL SZ UG ZW

AU 9936660 A Based on patent WO 9955833

Abstract (Basic): WO 9955833 A2

NOVELTY - A novel genus of bacteria, Lytobacter is disclosed which contains a species, Lytobacter mycophilus strain N4-7, that is antagonistic to soil-borne phytopathogenic fungi.

DETAILED DESCRIPTION - A biologically pure culture of a microorganism (A) having characteristics of the genus Lytobacter, which are gram-negative, non-motile, non-flagellate rods of size 0.3 x1.5 μ m; colonies pale yellow, smooth an opaque on Luria broth; pigment complex produced on Luria broth with dominant peak at 420 nm, aerobic, catalase positive, oxidase positive, chemoorganotrophic,

non-pathogenic; optimum growth at 25 - 30 degreesC, is new.

INDEPENDENT CLAIMS are also included for the following:

(1) a biologically pure culture of a microorganism comprising a 16S rDNA sequence that is at least 93% or 100% identical to the 1573 bp sequence given in the specification;

(2) a biologically pure culture of a microorganism which has a fatty acid composition wherein more than 0.1% fatty acid peak area is comprises of C10:0, C16:0 and iso-C17:0 fatty acids each comprise more than 0.1% of the fatty acid peak area, unsaturated fatty acids more than 18% and hydroxy fatty acids less than 2.0% by peak area;

(3) an antifungal substance isolated from *Lytobacter mycophilus*;

(4) a nucleic acid molecule (I) which is selected from:

(a) a molecule which is at least 87% identical to the 2943 bp sequence given in the specification;

(b) a molecule comprising the 2943 bp sequence given in the specification;

(c) a molecule that encodes a protein having at least 67% or 100% identity to the 683 amino acid sequence given in the specification;

(d) a molecule that encodes a protein that includes a sequence 60% or 100% identical to the 20 or 30 amino acid sequence given in the specification;

(5) a recombinant DNA molecule comprising (I), operably inserted into a vector for transforming cells;

(6) cells transformed with the DNA of (5), especially bacteria, yeast, fungi, insects, plants and mammals;

(7) a cultured cell line of the cells of (6);

(8) a living organism comprising the transformed cells of (6);

(9) a polypeptide produced by the expression of (I);

(10) an antibody immunologically specific to the polypeptide of (9);

(11) a culture medium for culturing a strain of *Lytobacter* that produces an enzyme selected from chitinase and beta-1,3-glucanase, the medium being optimized for expression of the enzyme, and comprising a minimal medium supplemented with chitin, laminarin, or *Magnaporthe poae* mycelium, or combinations thereof, in an amount effective to stimulate production of the enzyme as compared with an equivalent culture in medium not comprising the substance;

(12) a method for biologically controlling a plant disease caused by a plant-colonizing fungus, comprising inoculating the plants with an effective amount of a microbial inoculant having all the identifying characteristics of *L. mycophilus*.

USE - The antifungal *Lytobacter* species are used to suppress phytopathological fungi in soils. The bacteria may be **applied** to the **soil** as a soil drench. The bacterium has antifungal properties that are effective against a wide range of fungi, including but not limited to *Magnaporthe poae*, *Rhizoctonia solani*, *Pythium ultimum*, *Gaeumannomyces graminis*, *Letosphaeria korrae*, and *Sclerotinia homeocarpa*. Specifically, *Lytobacter mycophilus* strain N4-7 is effective in delaying the onset of symptoms of turfgrass of summer patch disease (caused by *Magnaporthe poae*). Other applications include foliar applications to suppress leaf-infecting fungi and seed inoculation. Other species of soil-borne bacteria can also be engineered to contain the antifungal proteins, especially chitinase, beta-1,3-glucanase, lipase or protease, of the bacteria of the invention. Transgenic crop plants can also be produced that express these proteins.

ADVANTAGE - A need exists in agriculture and especially the turfgrass industry for the discovery of new biological species that are antagonistic to pathogenic fungi. The present invention provides this need.

pp; 117 DwgNo 0/9

Derwent Class: C06; D16

International Patent Class (Main): C12N-000/00

15/7/4 (Item 4 from file: 350)

DIALOG(R)File 350:Derwent WPIX

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012720878

WPI Acc No: 1999-526990/199944

Microbial inoculant useful for improving soil quality and increasing plant production

Patent Assignee: TATKO BIOTECH INC (TATK-N)

Inventor: REDKINA T V; RED'KINA T V

Number of Countries: 091 Number of Patents: 005

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
US 5951978	A	19990914	US 98111776	A	19981210	199944	B
			US 98210403	A	19981211		
WO 200034440	A1	20000615	WO 99US28893	A	19991206	200035	
AU 200019349	A	20000626	AU 200019349	A	19991206	200045	
EP 1135462	A1	20010926	EP 99963025	A	19991206	200157	
			WO 99US28893	A	19991206		
BR 9916134	A	20011106	BR 9916134	A	19991206	200175	
			WO 99US28893	A	19991206		

Priority Applications (No Type Date): US 98111776 P 19981210; US 98210403 A 19981211

Patent Details:

Patent No Kind Lan Pg Main IPC Filing Notes
US 5951978 A 7 C12N-001/20 Provisional application US 98111776

WO 200034440 A1 E C12N-001/20

Designated States (National): AE AL AM AT AU AZ BA BB BG BR BY CA CH CN CR CU CZ DE DK DM EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT TZ UA UG UZ VN YU ZA ZW

Designated States (Regional): AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW NL OA PT SD SE SL SZ TZ UG ZW

AU 200019349 A C12N-001/20 Based on patent WO 200034440

EP 1135462 A1 E C12N-001/20 Based on patent WO 200034440

Designated States (Regional): AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI

BR 9916134 A C12N-001/20 Based on patent WO 200034440

Abstract (Basic): US 5951978 A

NOVELTY - A microbial inoculant (I) comprising Azospirillum brasiliense SAB MKB effective for application to a plant or soil is new.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for:

(1) a biologically pure culture of Azospirillum brasiliense SAB MKB (NRRL B-30082);

(2) a biologically pure culture of Azospirillum brasiliense SAB MKB (NRRL B-30081); and

(3) a method for growing Azospirillum brasiliense SAB MKB comprising inoculating a legume extract medium with Azospirillum brasiliense SAB MKB, culturing the inoculated legume extract at a time, temperature and aeration rate effective for providing a cell density of at least 1000 million-10000 million cells/ml.

USE - (I) is used to increase plant production in legumes, non-legumes and vegetable crops and improve soil quality (claimed). (I) is used to increase the nitrogen content of the soil and plant (claimed). (I) acts by improving the uptake of minerals by plants e.g. A. brasiliense SAB MKB can produce amino acids such as asparagine acid and proline which facilitate transport of nitrogen into plants.

(I) stimulates plant growth by producing plant growth regulators e.g. provides 500 microgram indole acetic acid per mg of protein and

inhibits a wide range of phytopathogenic microflora which occur in the root zone and can have a detrimental effect on plant productivity e.g. *Fusarium oxysporum*, *Thelaviopsis basicola*, *Alternaria*, *Aspergillus flavus*, *Mucor fragilis* and *Penicillium*.

ADVANTAGE - The inoculant can be used over a wide variety of soil types and climates in nonlegume, legume and vegetable plants.

pp; 7 DwgNo 0/0

Derwent Class: C06; D16

International Patent Class (Main): C12N-001/20

International Patent Class (Additional): A61K-038/44; A61K-038/54

15/7/5 (Item 5 from file: 350)

DIALOG(R)File 350:Derwent WPIX

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009701627

WPI Acc No: 1993-395180/199349

New heterotrophic bacteria - comprises Arthobacteria and Lactobacillus, capable of metabolising hydrocarbon and fixing nitrogen in sol

Patent Assignee: JERU ECOLOGY INC (JERU-N)

Inventor: SLAVENSKY F J

Number of Countries: 001 Number of Patents: 001

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
US 5266096	A	19931130	US 92837896	A	19920220	199349 B

Priority Applications (No Type Date): US 92837896 A 19920220

Patent Details:

Patent No	Kind	Lan	Pg	Main	IPC	Filing Notes
US 5266096	A	9		C05F	011/08	

Abstract (Basic): US 5266096 A

Heterotrophic bacteria capable of metabolising hydrocarbon and fixing nitrogen in soil comprises bacteria belonging to the genus Arthobacteria and bacteria belonging to the genus Lactobacillus and having all of the identifying characteristics of ATCC 55139.

Also described are: (1) soil amendment process comprising (a) preparing a mixt. of 96-98 wt.% water, 1-2 wt.% of at least one of yeast or bloodmeal and 1-2 wt.% of a glucose source, (b) inoculating the mixt. with a heterotrophic bacterial compsn. having all of the identifying characteristics of ATCC 55139, (c) allowing the inoculated mixt. to set for a period of 30 hrs. to 7 days, until the mixt. begins to release gas, (d) applying the inoculated mixt. to soil at a rate of 20-30 gallons/acre and mixing the **applied** mixt. with the **soil**; (2) preparing a **microbial** plant growth promoting **compsn**. comprising growing a bacterial culture of heterotrophic bacteria having all of the identifying characteristics of ATCC 55139 in a nutrient medium under growth conditions to a cell density of 4.8×10 power (3) - 1.4×10 power (8) cells/ml and diluting the culture with water for **application** to **soil**.

Heterotrophic bacteria were pref. obtd. from a sample of unknown origin growing on waste oil in California.

USE/ADVANTAGE - Heterotrophic bacteria decompose plant matter into humus, act as a nitrogen fixer and produce biologically active substances which combat diseases or insect infestations, and can also be used as a hydrocarbon degrading compsn. for use with oil spills, oil contamination or other hydrocarbon contamination events.

Dwg. 0/0

Derwent Class: C04; C05; D16; H04

International Patent Class (Main): C05F-011/08

International Patent Class (Additional): C09K-017/00

15/7/6 (Item 6 from file: 350)

DIALOG(R) File 350:Derwent WPIX

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008880244

WPI Acc No: 1992-007515/199201

Biological regeneration of contaminated soil or water - enhanced by slow release of nutrients to promote microorganism growth and activity

Patent Assignee: GRACE SIERRA HORTICULTURAL PROD CO (GRAC-N); GRACE SIERRA HORTIC (GRAC-N); SIERRA HORTICULTURAL PROD CO (SIER-N)

Inventor: CUNNINGHAM J

Number of Countries: 035 Number of Patents: 010

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
WO 9119039	A	19911212				199201	B
AU 9182110	A	19911231				199215	
EP 532675	A1	19930324	EP 91912339	A	19910606	199312	
			WO 91US3986	A	19910606		
JP 6500495	W	19940120	JP 91511759	A	19910606	199408	
			WO 91US3986	A	19910606		
US 5340376	A	19940823	US 90535393	A	19900608	199433	N
			WO 91US3986	A	19910606		
			US 92793355	A	19920108		
AU 655591	B	19950105	AU 9182110	A	19910606	199508	
EP 532675	A4	19930616	EP 91912339	A	19910000	199526	
EP 532675	B1	19960214	EP 91912339	A	19910606	199611	
			WO 91US3986	A	19910606		
DE 69117182	E	19960328	DE 617182	A	19910606	199618	
			EP 91912339	A	19910606		
			WO 91US3986	A	19910606		
CA 2084881	C	19980106	CA 2084881	A	19910606	199813	

Priority Applications (No Type Date): US 90535393 A 19900608; US 92793355 A 19920108

Cited Patents: US 3252786; US 3846290; US 4210437; US 4563208; DE 1592775; EP 184869; EP 27694; GB 2084608

Patent Details:

Patent No Kind Lan Pg Main IPC Filing Notes

WO 9119039	A	32	Designated States (National): AT AU BB BG BR CA CH DE DK ES FI GB HU JP KP KR LK LU MC MG MW NL NO PL RO SD SE SU US	
EP 532675	A1	E 32 D06M-016/00	Designated States (Regional): AT BE CH DE DK ES FR GB GR IT LU NL OA SE	Based on patent WO 9119039
JP 6500495	W	12 C02F-003/00	Designated States (Regional): AT BE CH DE DK ES FR GB GR IT LI LU NL SE	Based on patent WO 9119039
US 5340376	A	13 C05F-011/08		CIP of application US 90535393
AU 655591	B	C12N-005/02		Based on patent WO 9119039
EP 532675	B1	E 17 A62D-003/00		Previous Publ. patent AU 9182110
DE 69117182	E	A62D-003/00	Designated States (Regional): AT BE CH DE DK ES FR GB GR IT LI LU NL SE	Based on patent WO 9119039
CA 2084881	C	B09B-003/00		Based on patent EP 532675
				Based on patent WO 9119039

Abstract (Basic): WO 9119039 A

Biological remediation process in which **microorganisms** degrade contaminating organic **cpds**. over an extended period is enhanced by adding a low level controlled release source of microorganism nutrients to supply a growth and activity promoting level of nutrients over the extended period.

USE/ADVANTAGE - Process can be **applied** to water and **soil**

environments, including soil in or removed from its natural environment, naturally occurring or artificially created bodies of water, ground water, municipal waste water or industrial effluent and soil slurried in water. (all claimed). It can be used e.g. in degradation of oil spills. Labour costs can be reduced and environmental damage caused by nutrient run offs can be avoided. (32pp Dwg.No.0/6)

Abstract (Equivalent): EP 532675 B

A biological remediation process wherein microorganisms are employed to degrade contaminating organic compounds present within an environment over an extended period of time which comprises applying to said environment a low-level controlled-release source of microorganism nutrients capable of continuously supplying an effective microorganism growth and activity promoting level of nutrients to the microorganisms over a period of time of at least about two months, said controlled-release source of microorganism nutrients being in the form of coated solid particles each having a core of water soluble microorganism nutrients encapsulated in a release rate-controlling coating and where said particles are admixed in the environment at a level of 0.25 to 3 pounds per cubic yard of environment (0.30 to 1.78 kgm-3).

Dwg.0/6

Abstract (Equivalent): US 5340376 A

In a biological remediation process, microorganisms are used to degrade contaminating organic cpds. within an environment over an extended period of time. A low-level of controlled-release source of a micro-organisms nutrients is applied to the environment capable of continuously supplying a micro-organism growth- and activity promoting level of nutrients over at least 2 months. The source is in the form of coated solid particles having a core of water soluble microorganism nutrients encapsulated in a release rate-controlling coating and the particles are admixed at a level of 0.25-3 pounds/yd3 of environment.

The environment is e.g. soil or municipal waste water.

USE/ADVANTAGE - Used to reduce nutrient losses in open systems e.g. in bioremediation operations. The delivery systems reduce labour costs associated with nutrient application and reduces the potential for environmental damage due to nutrient run-off.

Dwg.0/6

Derwent Class: A97; D15; D16; H03; P35; P43

International Patent Class (Main): A62D-003/00; C02F-003/00; C05F-011/08; C12N-005/02; D06M-016/00

International Patent Class (Additional): B09B-003/00; C02F-003/02; C02F-011/02; C05F-003/00; C09K-017/00; C12N-001/00; C12S-001/00; C12S-013/00

15/7/7 (Item 7 from file: 350)

DIALOG(R)File 350:Derwent WPIX

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007136002

WPI Acc No: 1987-135999/198719

Microbial **compsn**. for treating soil - contg. flocculant-producing photosynthetic microorganism in rest stage and water dispersible carrier

Patent Assignee: SCHAEFER J W (SCHA-I); SOIL TECHNOL CORP (SOIL-N)

Inventor: BOYUM K W

Number of Countries: 041 Number of Patents: 010

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
WO 8702660	A	19870507	WO 86US2294	A	19861024	198719 B
ZA 8608245	A	19870430	ZA 868245	A	19861029	198730
AU 8665474	A	19870519				198732
EP 246281	A	19871125	EP 86906689	A	19861014	198747

CN 8607488	A	19870826			198841
US 4774186	A	19880927	US 85795272	A 19851105	198841
AU 9062461	A	19901213			199106
CA 1281910	C	19910326			199117
EP 246281	B	19920108			199203
DE 3683374	G	19920220			199209

Priority Applications (No Type Date): US 85795272 A 19851105

Cited Patents: US 3889418; US 3958364; US 3969844; DE 2362673; FR 1345584; FR 2303080; SSR880824

Patent Details:

Patent No Kind Lan Pg Main IPC Filing Notes

WO 8702660 A E

Designated States (National): AU BB BG BR DK FI HU JP KR LK MC MG MW NO RO SD SU

Designated States (Regional): AT BE CF CG CM DE FR GA GB IT LU ML MR NL SE SN TD TG

EP 246281 A E

Designated States (Regional): AT BE CH DE FR GB IT LI LU NL SE

US 4774186 A 12

EP 246281 B

Designated States (Regional): DE FR GB

Abstract (Basic): WO 8702660 A

A compsn. useful for improving soil comprises a dry, flowable mixt. of a flocculant-producing photosynthetic microorganisms (I) in a resting stage and a dry, particulate water dispersible carrier (II). The compsn. is capable of uniform **application** to dry **soil** to provide a cover crop of (I) in a vegetative stage and to improve soil aggregation through the action of the flocculant.

Abstract (Equivalent): EP 246281 B

A composition useful to improve soil, comprising a dry, flowable mixture of flocculant-producing photosynthetic microorganisms in a resting stage and a dry, particulate, water dispersible carrier, said composition being capable of uniform **application** to dry **soil** to provide a cover crop of said microorganisms in a vegetative stage and to improve soil aggregation through the action of said flocculant.

(2pp)

Abstract (Equivalent): US 4774186 A

Improved dry flowable water-suspendible **microbial** **compsn**. is produced, by (a) growing flocculant-producing photosynthetic microorganisms in a nutrient-contg. medium; and (b) inducing a resting stage in the microorganisms, by mixing them with a dry particulate water-dispersible carrier to form prod. Carrier comprises particles of dia. less than 0.05 mm.

Pref. microorganisms comprise algae from the strain Chlamydomonas, Chlorella, Oscillatoria, Aphonocapsa, Aphanothecae, Schizothrix, or Microcoleus.

USE - To improve soil aggregation, by uniformly applying to dry soil to form a cover crop

Derwent Class: C03; D16

International Patent Class (Additional): A01N-063/00; C05F-011/08; C09K-017/00; C12N-001/12; C12R-001/89

15/7/8 (Item 1 from file: 347)

DIALOG(R)File 347:JAPIO

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05290459

SOIL CONDITIONER

PUB. NO.: 08-245959 [JP 8245959 A]

PUBLISHED: September 24, 1996 (19960924)
 INVENTOR(s): OKABE HIROKI
 HINODE YUUJI
 KUWATA KAZUNORI
 APPLICANT(s): IKEDA SHOKKEN KK [000000] (A Japanese Company or Corporation)
 , JP (Japan)
 APPL. NO.: 07-048201 [JP 9548201]
 FILED: March 08, 1995 (19950308)

ABSTRACT

PURPOSE: To obtain a soil conditioner, excellent in effects on raising of good seedlings, shortening of the growing period, improvement in yield, etc., and having persistence thereof and excellent soil improving effects by blending a herb medicine component with a porous adsorbent.

CONSTITUTION: This soil conditioner comprises (A) an extract solution of Glycyrrhizae Radix (e.g. an alcohol extract solution of the Glycyrrhizae Radix) and (B) woody pulverized charcoal preferably at (2:1)-(1:20) weight ratio of the components (A):(B). One or more of components, such as an oil meal, a fish meal and activated sludge **microbial** cells are preferably **blended** as an extender for the soil conditioner. The weight ratio of the soil conditioner to the extender is preferably (2:1)-(1:10). The soil conditioner has preferably a granular dosage form having preferably 0.01mm-50mm grain diameter. The **soil** conditioner is preferably **applied** in an amount of 50-2,000kg/10a as a basal fertilizer for crop cultivation and preferably dusted in the above application amount on the surface of soil in the course of cultivation for horticultural cultivation, a golf course, etc.

15/7/9 (Item 2 from file: 347)

DIALOG(R)File 347:JAPIO
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04721011 **Image available**

COMPOSITION FOR CONTROLLING SOIL DISEASE DAMAGE

PUB. NO.: 06-192011 [JP 6192011 A]
 PUBLISHED: July 12, 1994 (19940712)
 INVENTOR(s): ISHIKAWA AKIRA
 FUJIMORI KENICHI
 MATSUURA KAZUO
 APPLICANT(s): TAKEDA CHEM IND LTD [000293] (A Japanese Company or Corporation), JP (Japan)
 APPL. NO.: 05-262122 [JP 93262122]
 FILED: October 20, 1993 (19931020)

ABSTRACT

PURPOSE: To obtain the subject composition showing excellent controlling effect on bacterial wilt by combining a compound such as validamycin well-known as a controller for bacterial scab and wilt, seedling damping-off, etc., or its derivative with other active ingredients of agricultural chemical.

CONSTITUTION: This composition for controlling soil disease damage comprises a compound of formula I (R₁ and R₃ are H or OH; R₂ is H or D-glucopyranosyl; R₄ is H, D-glucopyranosyl or D-glucopyranosyl-D-glucopyranosyl; R₅ is group of formula II (R₆ and R₇ are H or D-glucopyranosyl) or its salt. Validamycin A to G, Volidoxylamine A, B and G may be cited as the compound of formula I. The compound of formula I may further be blended with another active ingredient of agricultural chemical such as benomyl, iprodione, zineb, metalaxyl or fluazinam. When the composition is **applied** to plants or **soil**, the

composition immediately shows controlling effect and the agent is decomposed with **microorganisms**. Consequently, the **composition** will not remain in soil. The composition has excellent controlling effects on bacterial wilt.

15/7/10 (Item 3 from file: 347)

DIALOG(R)File 347:JAPIO
(c) 2002 JPO & JAPIO. All rts. reserv.

03828710

EXTERMINATION OF INSECT PEST AND PATHOGENIC GERM IN GROUND BY SOIL MICROORGANISM AND SOIL MICROORGANISM-CONTAINING FERTILIZER EXTERMINATING INSECT PEST AND PATHOGENIC GERM IN GROUND

PUB. NO.: 04-193810 [JP 4193810 A]
PUBLISHED: July 13, 1992 (19920713)
INVENTOR(s): AOKI YOSHINORI
SASADA ICHIYO
APPLICANT(s): AOKI YOSHINORI [000000] (An Individual), JP (Japan)
SASADA ICHIYO [000000] (An Individual), JP (Japan)
APPL. NO.: 02-321095 [JP 90321095]
FILED: November 27, 1990 (19901127)

ABSTRACT

PURPOSE: To advantageously exterminate insect pests and pathogenic germs in the ground by **blending** soil **microorganisms** consisting essentially of aerobic microorganisms comprising a specific amount of actino myces, a specific amount of common bacteria and a specific amount of molds with excrement of a specific animal in a specific ratio, applying the blend together with compost and plowing under a specific condition after the application.

CONSTITUTION: (A) Soil microorganisms consisting essentially of 10^(sup 6) to 10^(sup 9) actinomycetes, 10^(sup 6) to 10^(sup 8) common bacteria and 10^(sup 2) to 10^(sup 5) molds are blended with (B) excrement of birds or bats having short digestive organs and rapid excretion of foods on the ratio of 3-15kg component, A especially 3-10kg component A and 100-1,000kg component B, especially 100-600kg component B per Tan (0.245 acre) to give soil microorganism-containing fertilizer. In application of the fertilizer, the fertilizer is blended with compost, **applied** to **soil**, **soil** in the depth of 30-70cm, especially 30-50cm is plowed twice, the microorganisms A are propagated in the fertilizer consisting essentially of the excrement B to evolve a gas effective against insect pests. The actinomycetes having a higher propagation ratio than pathogenic germs suppress multiplication of the pathogenic germs to selectively exterminate underground insect pests and underground pathogenic germs.

15/7/11 (Item 4 from file: 347)

DIALOG(R)File 347:JAPIO
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03749888

ORGANIC MATERIAL TO BE APPLIED FOR CONTROLLING VIOLET ROOT ROT

PUB. NO.: 04-114988 [JP 4114988 A]
PUBLISHED: April 15, 1992 (19920415)
INVENTOR(s): TOKUDA YOSHIMARO
APPLICANT(s): HAMADA SEISAKUSHIYO KK [416033] (A Japanese Company or
Corporation), JP (Japan)
APPL. NO.: 02-233747 [JP 90233747]
FILED: September 03, 1990 (19900903)

ABSTRACT

PURPOSE: To obtain an organic material having improved blight-controlling effect by mixing excess sludge generated from a fish-processing plant with rice bran, animal manure and organic sludge to adjust the N/C ratio and fermenting the mixture in an aerobic atmosphere with aquatic **microorganisms** to convert the **mixture** into a composite.

CONSTITUTION: Excess sludge generated as a floating scum or precipitate in the waste-water treatment process of a fish-processing plant is mixed with cereal bran, animal manure and organic sludge to adjust the N/C ratio. The obtained mixture is used as a medium and converted into a composite by the fermentation with aquatic microorganisms in an aerobic atmosphere to obtain an organic material capable of forming a blight-suppressing **soil** to be **applied** for the control of violet root rot. The organic material is applied in an amount of usually 3-30kg for each tree.

?

13/3,K/1 (Item 1 from file: 5)
 DIALOG(R)File 5:Biosis Previews(R)
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13183607 BIOSIS NO.: 200100390756

Changes in the respiratory quinone profile of a soil treated with pesticides.

AUTHOR: Katayama Arata(a); Funasaka Keiko; Fujie Koichi

AUTHOR ADDRESS: (a)Research Center for Advanced Waste and Emission Management, Nagoya University, Chikusa, Nagoya, 464-8603:
 katayama@rescwe.nagoya-u.ac.jp**Japan

JOURNAL: Biology and Fertility of Soils 33 (6):p454-459 June, 2001

MEDIUM: print

ISSN: 0178-2762

DOCUMENT TYPE: Article

RECORD TYPE: Abstract

LANGUAGE: English

SUMMARY LANGUAGE: English

...ABSTRACT: Palehumult) were assessed for 28 days by monitoring changes in respiratory quinone profiles. Pesticides were *applied* to the *soil* at 10 times the recommended rates. Fenitrothion, linuron, and simazine did not significantly affect the...

...of microbial biomass), the diversity of the quinones (an indicator of taxonomic diversity of the *microbial* community), or the *composition* of the quinone species (an indicator of community structure). Chlorothalonil decreased the diversity of quinones...

13/3,K/2 (Item 2 from file: 5)

DIALOG(R)File 5:Biosis Previews(R)
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13138896 BIOSIS NO.: 200100346045

Soil microbial community responses to dairy manure or ammonium nitrate applications.

AUTHOR: Peacock A D; Mullen M D(a); Ringelberg D B; Tyler D D; Hedrick D B; Gale P M; White D C

AUTHOR ADDRESS: (a)Department of Plant and Soil Sciences, University of Tennessee, Knoxville, TN, 37901-1071: mmullen@utk.edu**USA

JOURNAL: Soil Biology & Biochemistry 33 (7-8):p1011-1019 June, 2001

MEDIUM: print

ISSN: 0038-0717

DOCUMENT TYPE: Article

RECORD TYPE: Abstract

LANGUAGE: English

SUMMARY LANGUAGE: English

...ABSTRACT: study, the effects of dairy manure applications and inorganic N fertilizer on microbial biomass and *microbial* community *composition* were determined. Treatments examined were a control with no nutrient additions (CT), ammonium nitrate at...

...two-thirds of the N applied in late April or early May, and the remainder *applied* in September. *Soil* samples (0-5, 5-10, and 10-15 cm) were taken in March 1996, prior...

...than in the CT and AN treatments. There was also a definable shift in the *microbial* community *composition* of the surface soils (0-5cm). Typical Gram-negative bacteria PLFA biomarkers were 15 and...

13/3,K/3 (Item 3 from file : 5)
 DIALOG(R)File 5:Biosis Previews(R)
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11721877 BIOSIS NO.: 199800503608

Relationship between soil neutral sugar composition and the amount of labile soil organic matter in Andisol treated with bark compost or leaf litter.

AUTHOR: Murata T(a); Nagaishi N; Hamada R; Tanaka H; Sakagami K; Kato T
 AUTHOR ADDRESS: (a)Fac. Agriculture, Tokyo Univ. Agriculture Technol.,
 Fuchu, Tokyo 183**Japan

JOURNAL: Biology and Fertility of Soils 27 (4):p342-348 Sept., 1998

ISSN: 0178-2762

DOCUMENT TYPE: Article

RECORD TYPE: Abstract

LANGUAGE: English

ABSTRACT: The effect of short-term bark compost (Ba) and leaf litter (Li) *applications* on the labile *soil* organic matter (SOM) status was investigated. The SOM status studied in this paper includes soil...

...available N, hot water extractable C (HwC) and N (HwN) and soil neutral sugar-C *composition*. The soil *microbial* biomass C (MBC) and N (MBN), soil available N, HwC and HwN increased upon application...

13/3,K/4 (Item 4 from file: 5)
 DIALOG(R)File 5:Biosis Previews(R)
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11531513 BIOSIS NO.: 199800312845

Productivity of acidified grassland caused by acidic nitrogen fertilizer and aluminum tolerance of grasses and legumes.

AUTHOR: Hojito Masayuki(a)

AUTHOR ADDRESS: (a)Konsen Agric. Exp. Stn., Nakashibetsu, Hokkaido 086-1153
 **Japan

JOURNAL: JARQ 32 (2):p87-96 April, 1998

ISSN: 0021-3551

DOCUMENT TYPE: Article

RECORD TYPE: Abstract

LANGUAGE: English

...**ABSTRACT:** in phosphorus uptake due to the suppression of root elongation by aluminum. Effects of lime *application* on grass growth, *soil* solution *composition*, and *microbial* activity were analyzed. The critical pH of the surface soil for which lime was needed...

13/3,K/5 (Item 5 from file: 5)
 DIALOG(R)File 5:Biosis Previews(R)
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10424248 BIOSIS NO.: 199699045393

Influence of compost and/or effective microorganisms on the growth of cucumber and on the incidence of Fusarium wilt.

AUTHOR: Melloni Rogerio; Duarte Keila M R; Cardoso Elke J B N

AUTHOR ADDRESS: Dep. Ciencia do Solo. ESALQ/USP, Caixa Postal 9,
 13418-9000, Piracicaba, SP**Brazil

JOURNAL: Summa Phytopathologica 21 (1):p21-24 1995

ISSN: 0100-5405

DOCUMENT TYPE: Article

RECORD TYPE: Abstract

LANGUAGE: Portuguese; Non-English

SUMMARY LANGUAGE: Portuguese; English

...ABSTRACT: 100 ton dry matter/ha) and the commercial product E.M.4, consisting of a *mixture* of effective *microorganisms* in four levels (without E.M.4. 1:100, 1:500 and 1:1000), diluted...

...after 26 days, plant were thinned to 2 per pot. E.M.4 suspensions were *applied* directly on the *soil* at weekly intervals. Plants were harvested 60 days after sowing. Then, the nongerminated seedy and...

13/3,K/6 (Item 6 from file: 5)

DIALOG(R)File 5:Biosis Previews(R)
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09318658 BIOSIS NO.: 199497327028

Accelerated biodegradation of atrazine by a microbial consortium is possible in culture and soil.

AUTHOR: Assaf Nasser A; Turco Ronald F

AUTHOR ADDRESS: Purdue Univ., Lab. Soil Microbiol., Dep. Agron., West Lafayette, IN 47907-1150**USA

JOURNAL: Biodegradation 5 (1):p29-35 1994

ISSN: 0923-9820

DOCUMENT TYPE: Article

RECORD TYPE: Abstract

LANGUAGE: English

ABSTRACT: A mixed enrichment culture of microorganisms capable of accelerated mineralization of atrazine was isolated from *soil* treated with successive *applications* of the herbicide. Liquid cultures of this consortium, in the presence of simple carbon sources...

...0.14 mM (concentration is based on total soil mass), and then inoculated with the *microbial* consortium, the parent *compound* was completely transformed in 25 days. After 30 days of incubation, 60% of the applied

...

13/3,K/7 (Item 7 from file: 5)

DIALOG(R)File 5:Biosis Previews(R)
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07406736 BIOSIS NO.: 000091022346

USING PHYSICOCHEMICAL METHODS TO DETERMINE THE MICROBIOLOGICAL ACTIVITY OF THE SOIL

AUTHOR: SAVICH V I; DOBERMANN A D; VAN'KOVA A A; NAUMOVA E V

AUTHOR ADDRESS: DIV. SOIL SCI., K.A. TIMIRYAZEV MOSC. AGRIC. ACAD., MOSCOW, USSR.

JOURNAL: IZV TIMIRYAZEV S-KH AKAD 0 (4). 1990. 51-62. 1990

FULL JOURNAL NAME: Izvestiya Timiryazevskoi Sel'skokhozyaistvennoi Akademii

CODEN: ITSAA

RECORD TYPE: Abstract

LANGUAGE: RUSSIAN

...ABSTRACT: possible and promising to estimate microbiological soil activity by the results of the effect of *microorganisms* on the *compounds* *applied* to the *soil*. Iron-reducing, denitrifying, cellulose-decomposing and nitrifying ability of soils after application of iron oxides...

13/3,K/8 (Item 8 from file: 5)

DIALOG(R)File 5:Biosis Previews(R)

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06746770 BIOSIS NO.: 000088056201

THE SOIL MICROBIAL COMMUNITY IN A SEWAGE-SLUDGE-AMENDED SEMI-ARID GRASSLAND

AUTHOR: DENNIS G L; FRESQUEZ P R

AUTHOR ADDRESS: ROCKY MOUNTAIN FOREST RANGE EXPERIMENT STN., USDA FOREST SERVICE, 2205 COLUMBIA SE, ALBUQUERQUE, NEW MEXICO 87106.

JOURNAL: BIOL FERTIL SOILS 7 (4). 1989. 310-317. 1989

FULL JOURNAL NAME: Biology and Fertility of Soils

CODEN: BFSOE

RECORD TYPE: Abstract

LANGUAGE: ENGLISH

...ABSTRACT: growing seasons. Most nutrient levels, including N, P, and K, increased linearly with increasing sludge *application* rates. *Soil* pH, however, declined linearly, from 7.8 to 7.4, with increasing sludge application rates...

...including Cd, did not increase with the small decrease in pH or with increasing sludge *application* rates. *Soil* bacterial, fungal, and ammonium oxidizer populations increased linearly with increasing sludge application rates, and Streptomyces...

...a degraded semi-arid grassland due to sludge application was reflected in populations, diversity, and *composition* of the soil *microbial* community.

13/3,K/9 (Item 9 from file: 5)

DIALOG(R)File 5:Biosis Previews(R)

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06655842 BIOSIS NO.: 000087098019

EFFECTS OF MIXTURE AND ACCLIMATION ON REMOVAL OF PHENOLIC COMPOUNDS IN SOIL

AUTHOR: NAMKOONG W; LOEHR R C; MALINA J F JR

AUTHOR ADDRESS: DEP. CIVIL ENG., UNIV. TEX., AUSTIN, TEX. 78712.

JOURNAL: J WATER POLLUT CONTROL FED 61 (2). 1989. 242-250. 1989

FULL JOURNAL NAME: Journal Water Pollution Control Federation

CODEN: JWPFA

RECORD TYPE: Abstract

LANGUAGE: ENGLISH

...ABSTRACT: phenolic compounds in a well-characterized fine sandy loam soil was evaluated. Phenolic compounds were *applied* to the *soil* as individual compounds and as mixtures. Certain phenolic compounds were reapplied to the same soil...

...triphosphate (ATP) in the soil was measured and used to evaluate the effect of phenolic *compounds* on overall soil *microbial* activity. The removal rates of phenolic compounds in a mixture were different from the removal...

13/3,K/10 (Item 10 from file: 5)

DIALOG(R)File 5:Biosis Previews(R)

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02993493 BIOSIS NO.: 000070019111

MICROBIOLOGICAL INVESTIGATIONS INTO SOIL IN A FERTILIZER TRIAL WITH SPRUCE IN THE FUME DAMAGED ZONE OF THE ERZGEBIRGE EAST GERMANY

AUTHOR: MAI H; FIEDLER H J

AUTHOR ADDRESS: SEKT. FORSTWIRTSCH. WISSENSCHAFTSBEREICH BODENKD.

STANDORTSLEHRE, TECH. UNIV. DRES., PIENNER STR. 8, DDR-8223 THARANDT, E. GER.

JOURNAL: ZENTRALBL BAKTERIOL PARASITENKD INFektionskr HYG ZWEITE NATURWISS
 ABT MIKROBIOL LANDWIRTSCH TECHNOL UMWELTSCHUTZES 134 (8). 1979 (RECD.
 1980). 651-659. 1979
 FULL JOURNAL NAME: Zentralblatt fuer Bakteriologie Parasitenkunde
 Infektionskrankheiten und Hygiene Zweite Naturwissenschaftliche Abteilung
 Mikrobiologie der Landwirtschaft der Technologie und des Umweltschutzes
 CODEN: ZBPUD
 RECORD TYPE: Abstract
 LANGUAGE: GERMAN

ABSTRACT: In the heavily fume-damaged spruce stands on crest sites the
 composition of *microbe* population and organic matter conversion in
 the A0 horizon can be positively changed with a...
 ...the SO₂ fallout on the microbiological conditions in the A0 horizon was
 observed. The increased *soil* fertility after *application* of Ca and P
 can lead to an increased and a more stable yield of...

13/3,K/11 (Item 1 from file: 10)

DIALOG(R)File 10:AGRICOLA
 (c) format only 2002 The Dialog Corporation. All rts. reserv.

3434843 20451736 Holding Library: AGL

**Effect of flow rate and path length on p-nitrophenol biodegradation
 during transport in soil**

Kelsey, J.W. Alexander, M.
 Cornell University, Ithaca, NY.
 [Madison, Wis.] Soil Science Society of America.
 Soil Science Society of America journal. Jan/Feb 1995. v. 59 (1) p.
 113-117.
 ISSN: 0361-5995 CODEN: SSSJD4
 DNAL CALL NO: 56.9 So3
 Language: English

... of p-nitrophenol (PNP) during its transport through soil was measured
 in columns of unsaturated *soil* receiving a continuous *application* of
 the compound. The PNP concentration in the effluents increased to a maximum
 and then...

... the path length was increased, presumably because of the longer period
 of contact between the *microorganisms* and the test *compound*. When PNP
 was still leaching into the effluent from a 10-cm column of soil...

13/3,K/12 (Item 2 from file: 10)

DIALOG(R)File 10:AGRICOLA
 (c) format only 2002 The Dialog Corporation. All rts. reserv.

3337938 20366964 Holding Library: AGL

Spatial variability of microbial processes in soil--a review
 Parkin, T.B.
 Madison : American Society Of Agronomy,
 Journal of environmental quality. July/Sept 1993. v. 22 (3) p. 409-417.
 ISSN: 0047-2425 CODEN: JEVQAA
 DNAL CALL NO: QH540.J6
 Language: English

... strategies have been employed to maximize the residence time of
 applied chemical in the surface *soil*, including: timing of *application*,
 formulation (e.g., slow-release fertilizers and encapsulated pesticides),
 and the use of *compounds* that modify *microbial* activity in soil (e.g.,
 nitrification inhibitors). Although these strategies have met with some
 success...

13/3,K/13 (Item 1 from file: 50)

DIALOG(R)File 50:CAB Abstracts

(c) 2002 CAB International. All rts. reserv.

03767114 CAB Accession Number: 990707353

Rice and wheat production in Pakistan with effective microorganisms.

Tahir Hussain; Javaid, T.; Parr, J. F.; Jilani, G.; Haq, M. A.

Nature Farming Research Center, University of Agriculture, Faisalabad, Pakistan.

American Journal of Alternative Agriculture vol. 14 (1): p.30-36

Publication Year: 1999

ISSN: 0889-1893 --

Language: English

Document Type: Journal article

--
... experiment was conducted at Faisalabad, Pakistan to determine the agronomic and economic merits of Effective *Microorganisms* (EM; a *mixture* of beneficial *microorganisms* including lactic acid bacteria, yeasts, actinomycetes and photosynthetic bacteria) in a rice-wheat cropping system. EM were *applied* to the *soil* or crop by spraying at each irrigation. Treatments were applied in a randomized complete block...

...that EM can enhance maximum economic yields in a rice-wheat rotation and also improve *soil* productivity when *applied* with organic amendments.

13/3,K/14 (Item 2 from file: 50)

DIALOG(R)File 50:CAB Abstracts

(c) 2002 CAB International. All rts. reserv.

03732705 CAB Accession Number: 991906338

Effect of long-term fertilizer *application* on *soil* *microorganisms* and humus *composition*.

Zhang Xiang; Zhu HongXun; Sun ChunHe; Cao YouJie

Soil and Fertilizer Institute, Henan Academy of Agricultural Sciences, Henan, China.

Acta Agriculturae Boreali-Sinica vol. 13 (2): p.87-92

Publication Year: 1998

ISSN: 1000-7091 --

Language: Chinese Summary Language: english

Document Type: Journal article

Effect of long-term fertilizer *application* on *soil* *microorganisms* and humus *composition*. --

... years of fixed location experiments were carried to study the effect of long term fertilizer *application* on *soil* *microorganisms*, humus *composition*, crop yield and soil fertility. Results showed that long-term application of chemical and organic...

13/3,K/15 (Item 3 from file: 50)

DIALOG(R)File 50:CAB Abstracts

(c) 2002 CAB International. All rts. reserv.

03394480 CAB Accession Number: 971906084

Effects of organic manure on the quality of coconut soils.

Tennakoon, N. A.; Mahindapala, R.; Widanapathirana, S.

Coconut Research Institute, Lunuwila, Sri Lanka.

Journal of the National Science Council of Sri Lanka vol. 23 (4):

p.171-182

Publication Year: 1995
 ISSN: 0300-9254 --
 Language: English
 Document Type: Journal article

--
 ...rate, nitrification), chemical (total N, available P, exchangeable K) and physical (soil moisture) changes of *soil* after the *application* of various treatments were assessed over a 12 month period. Application of organic manure (supplemented with inorganic fertilizers) and inorganic fertilizer *mixture* significantly increased *microbial* counts and microbiologically mediated processes in the soil compared with the control. Addition of goat...

13/3,K/16 (Item 4 from file: 50)
 DIALOG(R)File 50:CAB Abstracts
 (c) 2002 CAB International. All rts. reserv.

03012048 CAB Accession Number: 951903723
Effect of flow rate and path length of p-nitrophenol biodegradation during transport in soil.
 Kelsey, J. W.; Alexander, M.
 Inst. for Comparative and Environmental Toxicology, Cornell Univ., Ithaca, NY 14853, USA.
 Soil Science Society of America Journal vol. 59 (1): p.113-117
 Publication Year: 1995
 ISSN: 0361-5995 --
 Language: English
 Document Type: Journal article

--
 ...of p-nitrophenol (PNP) during its transport through soil was measured in columns of unsaturated *soil* receiving a continuous *application* of the compound. The PNP concentration in the effluents increased to a maximum and then...

... the path length was increased, presumably because of the longer period of contact between the *microorganisms* and the test *compound*. When PNP was still leaching into the effluent from a 10 cm column of soil...

13/3,K/17 (Item 5 from file: 50)
 DIALOG(R)File 50:CAB Abstracts
 (c) 2002 CAB International. All rts. reserv.

02375893 CAB Accession Number: 912305212
Interaction between growing substrate composition and Fusarium wilt of carnation.
 Duskova, E.; Prokina, E.
 Research and Breeding Institute of Ornamental Gardening, 25243
 Praha, Czechoslovakia.
 Conference Title: Interrelationships between microorganisms and plants in soil. Proceedings of an International Symposium, Liblice, Czechoslovakia, Jun. 22-27, 1987
 p.403-410
 Publication Year: 1989
 Editors: Vancura, V.; Kunc, F.
 Publisher: Elsevier Science Publishing Company, Inc. -- Amsterdam, Netherlands
 ISBN: 0-444-98922-6
 Language: English
 Document Type: Conference paper

-- ... C, the summer temp. up to 35 deg , and inoculation was by using naturally infested *soil*. The disease *spread* most rapidly in topsoil and peat (pH 5.0) and most slowly in a mix...

... various growing media, but the effect of pH was less pronounced. The pH value affected *microbial* *composition* , more acid media had a higher bacteria/fungi ratio. The number of Fusarium propagules was...

13/3,K/18 (Item 6 from file: 50)

DIALOG(R)File 50:CAB Abstracts
(c) 2002 CAB International. All rts. reserv.

00057567 CAB Accession Number: 720706695

Finding the optimum times of application for Banlene and Cambilene with different methods of autumn cultivation.

Shalna, A. I.
Vokeskii Filial Litovskogo Instituta Zemledeliya, Lyudvinavas, Vil'nyuskii Raion, Lithuanian SSR.
Materialy 7-go pribaltskogo soveshcheniya po zashchite rastenii, Elgava.
p.51-53
Publication Year: 1970 --
Language: Russian
Document Type: Miscellaneous

-- ... incidence by 90% and increased grain yields; applied herbicides had little effect on grain chemical *composition* or *soil* micro-*organisms*. *Application* of 4 kg Banlene or 5 kg Cambilene/ha in autumn was ineffective in increasing...

13/3,K/19 (Item 1 from file: 117)

DIALOG(R)File 117:Water Resour.Abs.
(c) 2002 Cambridge Scientific Abs. All rts. reserv.

00850758 WRA NUMBER: 4611153

Effects of secondary treated sewage effluent application on the populations of microfauna in a hardwood plantation soil: Bolivar HIAT trial

Gupta, V V S R ; Rogers, S ; Naidu, R
Cooperative Research Centre for Soil and Land Management, University of Adelaide, Waite Institute, Waite Road, Urrbrae, Adelaide, S.A. 5064, Australia

GEODERMA vol. 84, no. 1-3, pp. 249-263
1998

ISSN: 0016-7061

LANGUAGE: ENGLISH

DOCUMENT TYPE: Journal article

...DESCRIPTORS: Secondary Wastewater Treatment; Water Pollution Effects; Heavy Metals; Population Dynamics; Sewage disposal; Effluent disposal; Land *application*; *Microbial* activity; *Soil*; Community *composition*; Eucalyptus; Casuarina; Nematoda; Acanthamoeba; Naegleria

13/3,K/20 (Item 2 from file: 117)

DIALOG(R)File 117:Water Resour.Abs.
(c) 2002 Cambridge Scientific Abs. All rts. reserv.

00706611 WRA NUMBER: 8913000

Two-Dimensional Transport and Fate of Chemicals Emitted by Arbitrarily Placed Sources in Confined Aquifers

Lindstrom, F T ; Boersma, L

Oregon State Univ. Corvallis. Dept. of Soil Science

Water Resources Research WRERAQ Vol. 25, No. 7, p 1748-1756, July 1989. 8 fig, 3 tab, 7 ref.

1989

DOCUMENT TYPE: Journal article

...ABSTRACT: and the transformations of chemicals leaking into confined aquifers. Linear equilibrium rules are assumed to *apply* to the sorbing *soil* components made up of weakly sorbing and strongly sorbing fractions and an organic matter fraction. First-order or zero-order loss rates of *compound* due to *microbial* or other irreversible loss processes are included. Aquifers of rectangular shape and infinite in the...

13/3,K/21 (Item 1 from file: 144)

DIALOG(R)File 144:Pascal

(c) 2002 INIST/CNRS. All rts. reserv.

13017061 PASCAL No.: 97-0302181

Interactions of clay minerals with Arthrobacter crystallopioetes : starvation, survival and 2-hydroxypyridine catabolism

HWANG S; TATE R L III

Department of Environmental Sciences, Cook College, Rutgers University, New Brunswick, NJ 08903, United States

Journal: Biology and fertility of soils, 1997, 24 (3) 335-340

Language: English

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Broad Descriptors: Dekontaminierung; Umgebung; Mikroorganismus; Organische Verbindung; Decontamination; Biodegradation; Environment; Environmental factor; Metabolism; Microbiological method; *Applied* microbiology; *Soil* pollution; Physicochemical properties; Arthrobacter; Actinomycetes ; Bacteria; *Microorganism*; Biological model; Model *compound*; Organic compounds; Nitrogen heterocycle; Silicate mineral; Phyllosilicate; Pyridine derivatives; Xenobiotic; Soil biology; Decontamination; Degradation biologique...

13/3,K/22 (Item 2 from file: 144)

DIALOG(R)File 144:Pascal

(c) 2002 INIST/CNRS. All rts. reserv.

12406672 PASCAL No.: 96-0056309

Effects of thiamine on growth rates of Rhizobium spp. and putative diazotrophic bacteria cultivated in vitro at different pH

AZAIZEH H A; NEUMANN G; MARSCHNER H

Univ. Hohenheim, Inst. Pflanzenernaehrung, 70593 Stuttgart, Federal Republic of Germany

Journal: Zeitschrift fuer Pflanzenernaehrung und Bodenkunde, 1995, 158 (6) 557-562

Language: English Summary Language: German

Broad Descriptors: Mikroorganismus; Rhizobiaceae; Soil management; Biodynamics; Nitrogen fixation; Biological fixation; *Applied* microbiology; *Soil* plant relation; *Microorganism*; Symbionte; Biological *compound*; B-Vitamins; Rhizobiaceae; Amenagement sol; Biodynamique; Fixation azote; Fixation biologique; Microbiologie appliquee; Relation sol plante...

13/3, K/23 (Item 3 from file: 144)

DIALOG(R)File 144:Pascal

(c) 2002 INIST/CNRS. All rts. reserv.

11327082 PASCAL No.: 94-0148421

A comparison of soil and microbial carbon, nitrogen, and phosphorus contents, and macro-aggregate stability of a soil under native forest and after clearance for pastures and plantation forest

SPARLING G P; HART P B S; AUGUST J A; LESLIE D M

Landcare res. New Zealand, Lower Hutt, New Zealand

Journal: *Biology and fertility of soils*, 1994, 17 (2) 91-100

Language: English

...Broad Descriptors: Zusammensetzung; Chemische Eigenschaft; Coniferales; Gymnospermae; Spermatophyta; Monocotyledones; Angiospermae; Leguminosae; Dicotyledones; Oceania; Physical properties; Forestry; Agriculture; *Applied* microbiology; Bioinorganic chemistry; *Soil* stability; Chemical *composition*; *Microbial* activity; Reclamation; Anthropogenic factor; Soil structure; Organic matter; Softwood forest tree; Fodder crop ; Woody plant...

?

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      (c) 2002 The HW Wilson Co.
File 117:Water Resour.Abs. 1967-2002/Dec
      (c) 2002 Cambridge Scientific Abs.
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      (c) 2002 The HW Wilson Co.
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File 306:Pesticide Fact File 1998/Jun
      (c) 1998 BCPC
File 434:SciSearch(R) Cited Ref Sci 1974-1989/Dec
      (c) 1998 Inst for Sci Info

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Set	Items	Description
S1	3062120	MICROBE? ? OR MICROBIAL? OR MICROORGANISM? OR MICRO()ORGANISM?
S2	577581	PESTICIDE?
S3	4895445	APPLIED? OR APPLICATION? OR SPREAD? OR APPLY OR MIXIN OR MIX
S4	5999458	COMPOSITION? OR COMPOUND? OR BLEND? OR MIXTURE?
S5	16101	S1(3N)S4
S6	1783879	SOIL
S7	58738	S6(3N)S3
S8	98	S7 AND S5
S9	68	RD (unique items)
S10	4	S9/2001:2002
S11	64	S9 NOT S10
S12	47	S5(S)S7
S13	23	RD (unique items)
?		

13/3,K/1 (Item 1 from file: 16)
DIALOG(R)File 16:Gale Group PROMT(R)
(c) 2002 The Gale Group. All rts. reserv.

07509339 Supplier Number: 63034143 (USE FORMAT 7 FOR FULLTEXT)
U.S. Microbics Subsidiary Receives Supply Contract From Soil Wash Technologies.

Business Wire, p2222
June 29, 2000
Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 568

... We believe our hydrocarbon bioremediation treatment products provide excellent results in a wide variety of *applications* including *soil* washing. With a custom combination of selected, naturally occurring microbes in our formulations, which have been developed over thirty years, our *microbial* *blends* provide truly state-of-the-art bioremediation. Our customers can be assured quality products supplied...

13/3,K/2 (Item 2 from file: 16)
DIALOG(R)File 16:Gale Group PROMT(R)
(c) 2002 The Gale Group. All rts. reserv.

06744388 Supplier Number: 56642261 (USE FORMAT 7 FOR FULLTEXT)
U.S. Microbics Treats Contaminated Soil at Signal Hill Petroleum Site.

PR Newswire, p4339
Oct 20, 1999
Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 533

(USE FORMAT 7 FOR FULLTEXT)

TEXT:
...Board: BUGS) announced today that the company's patented Bio-Raptor(TM) process and proprietary *microbial* *blends* were *applied* to *soil* contaminated with crude oil at a site in Long Beach, California owned by Signal Hill... .

... on the effectiveness of the bioremediation process using the Bio-Raptor(TM) and the proprietary *microbial* *blends* custom manufactured for client jobs. A consortium consisting of BRI Environmental, Signal Hill Petroleum, and...

...degradation rates and times, equipment and manpower operation, throughput rates, process costs, sampling methodology and *soil* morphology logistics. The *application* of *microbial* *blends* was accomplished in less than three days and sampling results, degradation times and final results...

13/3,K/3 (Item 3 from file: 16)
DIALOG(R)File 16:Gale Group PROMT(R)
(c) 2002 The Gale Group. All rts. reserv.

06281856 Supplier Number: 54421261 (USE FORMAT 7 FOR FULLTEXT)
BUGS Bio-Raptor Well-Received at International Bioremediation Conference.

PR Newswire, p4524
April 20, 1999
Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 575

... recycling center. The machine is also used worldwide in rock quarries and construction sites for *soil* screening *applications*, recycling, and aggregate sizing. Companies with machines similar to the Bio-Raptor(TM) can have their existing equipment retrofitted with the proprietary Microbial Application System to utilize the *microbial* *blends* required for bioremediation and waste processing.

"The International Insitu Bioremediation Conference is an excellent opportunity..."

13/3,K/4 (Item 1 from file: 18)
 DIALOG(R)File 18:Gale Group F&S Index(R)
 (c) 2002 The Gale Group. All rts. reserv.

01201476 Supplier Number: 40883990
Newsfront: In situ cleanup of contaminated soil
 Chemical Engineering, p55
 August, 1989
 ISSN: 0009-2460
 Language: English Record Type: Abstract
 Document Type: Magazine/Journal; Refereed; Trade

ABSTRACT:

...dia) that are inserted up to 30' into the ground. As the blades turn and *mix* the *soil*, the treatment agents (or agent) are delivered to the soil through jets on the blades. The treatment agents may be steam, air, chemical *compounds* or *microorganisms* and necessary nutrients. Vapors generated are collected, scrubbed and returned to the underground site. Toxic...

13/3,K/5 (Item 1 from file: 20)
 DIALOG(R)File 20:Dialog Global Reporter
 (c) 2002 The Dialog Corp. All rts. reserv.

07954637 (USE FORMAT 7 OR 9 FOR FULLTEXT)
US Microbics treats contaminated soil at Signal Hill Petroleum site
 CHEMICAL BUSINESS NEWSBASE (PRESS RELEASE)
 October 27, 1999
 JOURNAL CODE: FPRR LANGUAGE: English RECORD TYPE: FULLTEXT
 WORD COUNT: 236

... Inc announced that the company's patented Bio-Raptor process and proprietary microbial blends were *applied* to *soil* contaminated with crude oil at a site in Long Beach, CA owned by Signal Hill...

13/3,K/6 (Item 1 from file: 50)
 DIALOG(R)File 50:CAB Abstracts
 (c) 2002 CAB International. All rts. reserv.

04120818 CAB Accession Number: 20013098088
Changes in the respiratory quinone profile of a soil treated with pesticides.
 Katayama, A.; Funasaka, K.; Fujie, K.
 Graduate School of Bioagricultural Sciences, Nagoya University, Chikusa, Nagoya 464-8601, Japan.
 Biology and Fertility of Soils vol. 33 (6): p.454-459
 Publication Year: 2001
 ISSN: 0178-2762 --
 Language: English
 Document Type: Journal article

--
 ... Palehumult) were assessed for 28 days by monitoring changes in respiratory quinone profiles. Pesticides were *applied* to the *soil* at 10 times the recommended rates. Fenitrothion, linuron, and simazine did not significantly affect the...

... of microbial biomass), the diversity of the quinones (an indicator of taxonomic diversity of the *microbial* community), or the *composition* of the quinone species (an indicator of community structure). Chlorothalonil decreased the diversity of quinones...

13/3,K/7 (Item 2 from file: 50)

DIALOG(R)File 50:CAB Abstracts
 (c) 2002 CAB International. All rts. reserv.

04068810 CAB Accession Number: 20013081850

Soil microbial community responses to dairy manure or ammonium nitrate applications.

Peacock, A. D.; Mullen, M. D.; Ringelberg, D. B.; Tyler, D. D.; Hedrick, D. B.; Gale, P. M.; White, D. C.

Center for Environmental Biotechnology, 10515 Research Drive, Suite 300, University of Tennessee, Knoxville, TN 37932, USA.

Soil Biology & Biochemistry vol. 33 (7/8): p.1011-1019

Publication Year: 2001

ISSN: 0038-0717 --

Language: English

Document Type: Journal article

--
 ... study, the effects of dairy manure applications and inorganic N fertilizer on microbial biomass and *microbial* community *composition* were determined. Treatments examined were: (1) control with no nutrient additions (CT); (2) ammonium nitrate...

... two-thirds of the N applied in late April or early May, and the remainder *applied* in September. *Soil* samples (0-5, 5-10, and 10-15 cm) were taken in the plots in...

... than in the CT and AN treatments. There was also a definable shift in the *microbial* community *composition* of the surface soils (0-5cm). Typical Gram negative bacteria PLFA biomarkers were 15 and...

13/3,K/8 (Item 3 from file: 50)

DIALOG(R)File 50:CAB Abstracts
 (c) 2002 CAB International. All rts. reserv.

03767114 CAB Accession Number: 990707353

Rice and wheat production in Pakistan with effective microorganisms.

Tahir Hussain; Javaid, T.; Parr, J. F.; Jilani, G.; Haq, M. A.

Nature Farming Research Center, University of Agriculture, Faisalabad, Pakistan.

American Journal of Alternative Agriculture vol. 14 (1): p.30-36

Publication Year: 1999

ISSN: 0889-1893 --

Language: English

Document Type: Journal article

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 ... experiment was conducted at Faisalabad, Pakistan to determine the agronomic and economic merits of Effective *Microorganisms* (EM; a *mixture* of beneficial *microorganisms* including lactic acid bacteria,

yeasts, actinomycetes and photosynthetic bacteria) in a rice-wheat cropping system. EM were *applied* to the *soil* or crop by spraying at each irrigation. Treatments were applied in a randomized complete block...

...that EM can enhance maximum economic yields in a rice-wheat rotation and also improve *soil* productivity when *applied* with organic amendments.

13/3,K/9 (Item 4 from file: 50)

DIALOG(R)File 50:CAB Abstracts
(c) 2002 CAB International. All rts. reserv.

03732705 CAB Accession Number: 991906338

Effect of long-term fertilizer *application* on *soil* *microorganisms* and humus *composition*.

Zhang Xiang; Zhu HongXun; Sun ChunHe; Cao YouJie
Soil and Fertilizer Institute, Henan Academy of Agricultural Sciences, Henan, China.

Acta Agriculturae Boreali-Sinica vol. 13 (2): p.87-92

Publication Year: 1998

ISSN: 1000-7091 --

Language: Chinese Summary Language: english

Document Type: Journal article

Effect of long-term fertilizer *application* on *soil* *microorganisms* and humus *composition*. --

... years of fixed location experiments were carried to study the effect of long term fertilizer *application* on *soil* *microorganisms*, humus *composition*, crop yield and soil fertility. Results showed that long-term application of chemical and organic...

13/3,K/10 (Item 5 from file: 50)

DIALOG(R)File 50:CAB Abstracts
(c) 2002 CAB International. All rts. reserv.

03645958 CAB Accession Number: 981915940

Relationship between soil neutral sugar composition and the amount of labile soil organic matter in Andisol treated with bark compost or leaf litter.

Murata, T.; Nagaishi, N.; Hamada, R.; Tanaka, H.; Sakagami, K.; Kato, T.
Faculty of Agriculture, Tokyo University of Agriculture and Technology, Fuchu, Tokyo 183, Japan.

Biology and Fertility of Soils vol. 27 (4): p.342-348

Publication Year: 1998

ISSN: 0178-2762 --

Language: English

Document Type: Journal article

--
The effect of short-term bark compost (Ba) and leaf litter (Li) *applications* on the labile *soil* organic matter (SOM) status was investigated. The SOM status studied in this paper includes soil...

... available N, hot water extractable C (HwC) and N (HwN) and soil neutral sugar-C *composition*. The soil *microbial* biomass C (MBC) and N (MBN), soil available N, HwC and HwN increased upon application...

13/3,K/11 (Item 6 from file: 50)

DIALOG(R)File 50:CAB Abstracts
(c) 2002 CAB International. All rts. reserv.

03575408 CAB Accession Number: 980706914

Productivity of acidified grassland caused by acidic nitrogen fertilizer and aluminum tolerance of grass s and legum s.

Hojito, M.

Konsen Agricultural Experiment Station, Nakashibetsu, Hokkaido 086-1153, Japan.

JARQ, Japan Agricultural Research Quarterly vol. 32 (2): p.87-96

Publication Year: 1998

ISSN: 0021-3551 --

Language: English

Document Type: Journal article

--
... in P uptake due to the suppression of root elongation by Al. Effects of lime *application* on grass growth, *soil* solution *composition*, and *microbial* activity were analysed. The critical pH of the surface soil for which lime was needed...

13/3,K/12 (Item 7 from file: 50)

DIALOG(R)File 50:CAB Abstracts

(c) 2002 CAB International. All rts. reserv.

03394480 CAB Accession Number: 971906084

Effects of organic manure on the quality of coconut soils.

Tennakoon, N. A.; Mahindapala, R.; Widanapathirana, S.

Coconut Research Institute, Lunuwila, Sri Lanka.

Journal of the National Science Council of Sri Lanka vol. 23 (4):

p.171-182

Publication Year: 1995

ISSN: 0300-9254 --

Language: English

Document Type: Journal article

--
...rate, nitrification), chemical (total N, available P, exchangeable K) and physical (soil moisture) changes of *soil* after the *application* of various treatments were assessed over a 12 month period. Application of organic manure (supplemented with inorganic fertilizers) and inorganic fertilizer *mixture* significantly increased *microbial* counts and microbiologically mediated processes in the soil compared with the control. Addition of goat...

13/3,K/13 (Item 8 from file: 50)

DIALOG(R)File 50:CAB Abstracts

(c) 2002 CAB International. All rts. reserv.

03292620 CAB Accession Number: 961006335

Influence of compost and/or effective microorganisms on the growth of cucumber and on the incidence of Fusarium wilt.

Original Title: Efeito de composto de lixo urbano e/ou de E.M.4 (effective microorganisms) no desenvolvimento de pepino (*Cucumis sativus*) e no controle de fusariose.

Melloni, R.; Duarte, K. M. R.; Cardoso, E. J. B. N.

Dept. de Ciencia do Solo, ESALQ/USP, Caixa Postal 9, 13418-900, Piracicaba, SP, Brazil.

Summa Phytopathologica vol. 21 (1): p.21-24

Publication Year: 1995

ISSN: 0100-5405 --

Language: Portuguese Summary Language: english

Document Type: Journal article

-- ...100 t dry matter/ha and the commercial product E.M.4, consisting of a *mixture* of effective *microorganisms*, at 4 levels (without E.M.4, 1:100, 1:500 and 1:1000), diluted...

...26 d, the plants were thinned to 2 per pot. E.M.4 suspensions were *applied* directly to *soil* at weekly intervals. Plants were harvested 60 d after sowing, Then, the nongerminated seeds and...

13/3,K/14 (Item 9 from file: 50)

DIALOG(R)File 50:CAB Abstracts
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03012048 CAB Accession Number: 951903723

Effect of flow rate and path length of p-nitrophenol biodegradation during transport in soil.

Kelsey, J. W.; Alexander, M.
Inst. for Comparative and Environmental Toxicology, Cornell Univ.,
Ithaca, NY 14853, USA.
Soil Science Society of America Journal vol. 59 (1): p.113-117
Publication Year: 1995
ISSN: 0361-5995 --
Language: English
Document Type: Journal article

-- ...of p-nitrophenol (PNP) during its transport through soil was measured in columns of unsaturated *soil* receiving a continuous *application* of the compound. The PNP concentration in the effluents increased to a maximum and then...

... the path length was increased, presumably because of the longer period of contact between the *microorganisms* and the test *compound*. When PNP was still leaching into the effluent from a 10 cm column of soil...

13/3,K/15 (Item 10 from file: 50)

DIALOG(R)File 50:CAB Abstracts
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02858944 CAB Accession Number: 941300763

Accelerated biodegradation of atrazine by a microbial consortium is possible in culture and soil.

Assaf, N. A.; Turco, R. F.
Purdue University, Laboratory for Soil Microbiology, Department of
Agronomy, West Lafayette, IN 47907-1150, USA.
Biodegradation vol. 5 (1): p.29-35
Publication Year: 1994
ISSN: 0923-9820 --
Language: English
Document Type: Journal article

-- A mixed enrichment culture of microorganisms capable of accelerated mineralization of atrazine was isolated from *soil* treated with successive *applications* of the herbicide. Liquid cultures of this consortium, in the presence of simple carbon sources...

... 0.14 mM (concn is based on total soil mass), and then inoculated with the *microbial* consortium, the parent *compound* was completely transformed in 25 d. After 30 d of incubation, 60% of the applied...

13/3,K/16 (Item 11 from file: 50)
 DIALOG(R)File 50:CAB Abstracts
 (c) 2002 CAB International. All rts. reserv.

02375893 CAB Accession Number: 912305212
Interaction between growing substrat composition and Fusarium wilt of carnation.

Duskova, E.; Prokinova, E.
 Research and Breeding Institute of Ornamental Gardening, 25243
 Praha honice, Czechoslovakia.

Conference Title: Interrelationships between microorganisms and plants
 in soil. Proceedings of an International Symposium, Liblice,
 Czechoslovakia, Jun. 22-27, 1987

p.403-410
 Publication Year: 1989
 Editors: Vancura, V.; Kunc, F.
 Publisher: Elsevier Science Publishing Company, Inc. -- Amsterdam,
 Netherlands
 ISBN: 0-444-98922-6
 Language: English
 Document Type: Conference paper

--
 ... C, the summer temp. up to 35 deg , and inoculation was by using
 naturally infested *soil*. The disease *spread* most rapidly in topsoil
 and peat (pH 5.0) and most slowly in a mix...

... various growing media, but the effect of pH was less pronounced. The pH
 value affected *microbial* *composition* , more acid media had a higher
 bacteria/fungi ratio. The number of Fusarium propagules was...

13/3,K/17 (Item 12 from file: 50)
 DIALOG(R)File 50:CAB Abstracts
 (c) 2002 CAB International. All rts. reserv.

00057567 CAB Accession Number: 720706695

Finding the optimum times of application for Banlene and Cambilene with different methods of autumn cultivation.

Shalna, A. I.
 Vokeskii Filial Litovskogo Instituta Zemledeliya, Lyudvinavas,
 Vil'nyuskii Raion, Lithuanian SSR.
 Materialy 7-go pribaltskogo soveshcheniya po zashchite rastenii, Elgava.
 p.51-53
 Publication Year: 1970 --
 Language: Russian
 Document Type: Miscellaneous

--
 ... incidence by 90% and increased grain yields; applied herbicides had
 little effect on grain chemical *composition* or *soil* micro-*organisms*.
 Application of 4 kg Banlene or 5 kg Cambilene/ha in autumn was
 ineffective in increasing...

13/3,K/18 (Item 1 from file: 160)
 DIALOG(R)File 160:Gale Group PROMT(R)
 (c) 1999 The Gale Group. All rts. reserv.

01010837
BioTechnica inks accord with Monsanto and Heinz on gen tic engineering.
 Chemical Marketing Reporter April 2, 1984 p. 51

... Monsanto. The new pesticide is 1 of a series of agrochemicals produced by *Streptomyces*, a *soil* microorganism. BioTechnica will *apply* genetic engineering technology to the development of a *microbial* process for the *compound* that is more economical than traditional chemical syntheses. The arrangement between Monsanto and BioTechnica stipulates...

13/3,K/19 (Item 1 from file: 285)
 DIALOG(R)File 285:BioBusiness(R)
 (c) 1998 BIOSIS. All rts. reserv.

00180521

EFFECTS OF MIXTURE AND ACCLIMATION ON REMOVAL OF PHENOLIC COMPOUNDS IN SOIL.

Namkoong W; Loehr R C; Malina J F Jr
 DEP. CIVIL ENG., UNIV. TEX., AUSTIN, TEX. 78712.
 Journal Water Pollution Control Federation Vol.61, No.2, p.242-250, 1989.

...ABSTRACT: phenolic compounds in a well-characterized fine sandy loam soil was evaluated. Phenolic compounds were *applied* to the *soil* as individual compounds and as mixtures. Certain phenolic compounds were reapplied to the same soil...

...triphosphate (ATP) in the soil was measured and used to evaluate the effect of phenolic *compounds* on overall soil *microbial* activity. The removal rates of phenolic compounds in a mixture were different from the removal...

13/3,K/20 (Item 1 from file: 636)
 DIALOG(R)File 636:Gale Group Newsletter DB(TM)
 (c) 2002 The Gale Group. All rts. reserv.

04510439 Supplier Number: 57883580 (USE FORMAT 7 FOR FULLTEXT)
U.S. Microbics Treats Petroleum Site.

Waste Treatment Technology News, v16, n3, pNA

Nov, 1999

Language: English Record Type: Fulltext

Document Type: Newsletter; Trade

Word Count: 365

(USE FORMAT 7 FOR FULLTEXT)

TEXT:

...1860, Fax: 760/918-1855) says that the company's Bio-Raptor process and proprietary *microbial* *blends* were *applied* to *soil* contaminated with crude oil at a site in Long Beach, California, owned by Signal Hill...

... degradation rates and times, equipment and manpower operation, throughput rates, process costs, sampling methodology, and *soil* morphology logistics. The *application* of *microbial* *blends* was accomplished in less than three days and sampling results, degradation times, and final results...

13/3,K/21 (Item 2 from file: 636)
 DIALOG(R)File 636:Gale Group Newsletter DB(TM)
 (c) 2002 The Gale Group. All rts. reserv.

04189437 Supplier Number: 54806873 (USE FORMAT 7 FOR FULLTEXT)
Demand for Solid-Waste Incinerators Heats Up in Germany, Group Reports.

Solid Waste Report, v30, n21, pNA

May 27, 1999

Language: English Record Type: Fulltext

Document Type: Newsletter; Trade
Word Count: 993

... BUGS), Carlsbad Calif., recently introduced its patented Bio-Raptor(tm). The Bio-Raptor uses proprietary *microbial* *blends* with a patented *applications* process to decontaminate *soil*, decompose green waste and remove odors, pathogens, and weed seeds from animal effluent. The Bio...
?

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show files;ds
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  (c) 2002 The Gale Group

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Set	Items	Description
S1	212092	MICROBE? ? OR MICROBIAL? OR MICROORGANISM? OR MICRO()ORGANISM?
S2	416542	PESTICIDE?
S3	7582363	APPLIED? OR APPLICATION? OR SPREAD? OR APPLY OR MIXIN OR MIX
S4	2048726	COMPOSITION? OR COMPOUND? OR BLEND? OR MIXTURE?
S5	3138	S1(3N)S4
S6	640526	SOIL
S7	25776	S6(3N)S3
S8	46	S7 AND S5
S9	35	RD (unique items)
S10	4	S9/2001:2002
S11	31	S9 NOT S10
S12	30	S5(S)S7
S13	21	RD (unique items)
?		

L Number	Hits	Search Text	DB	Time stamp
1	0	5939086.uref,oref.	USPAT; US-PGPUB	2002/01/28 11:27
2	0	6194193.uref,oref.	USPAT; US-PGPUB	2002/01/28 11:28
3	0	6194193.uref.	USPAT; US-PGPUB	2002/01/28 11:28
5	2	(("4061488") or ("5061490")).PN.	USPAT; US-PGPUB	2002/01/28 11:28

L Number	Hits	Search Text	DB	Time stamp
1	112	microbial with blend	USPAT; US-PGPUB	2002/01/28 09:20
2	7897	(microbial or microbe) and (mixture or composition or blend)	EPO; JPO; DERWENT	2002/01/28 09:23
3	459	(microbial or microbe) and (mixture or composition or blend) and soil	EPO; JPO; DERWENT	2002/01/28 09:24
4	103	(microbial or microbe) and (mixture or composition or blend) and soil and (nutritional or nutrient or beneficial)	EPO; JPO; DERWENT	2002/01/28 09:26